United States Department of Agriculture, Soil Conservation Service
in cooperation with
College of Agricultural Sciences
University of Puerto Rico, Mayaguez Campus

soil survey of
Arecibo Area
Northern Puerto Rico

HOW TO USE

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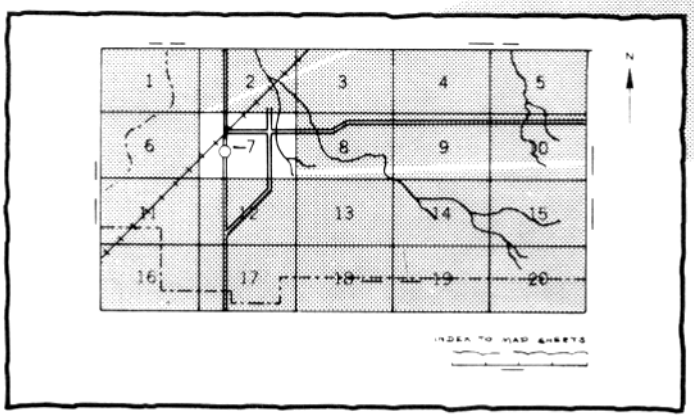

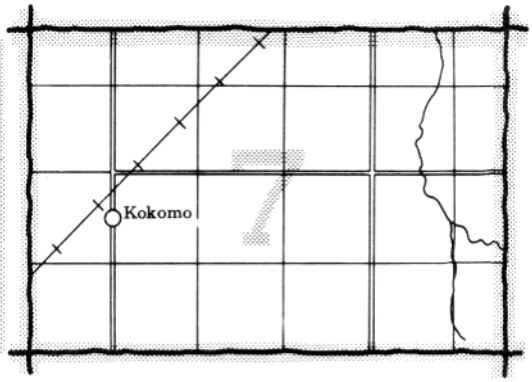

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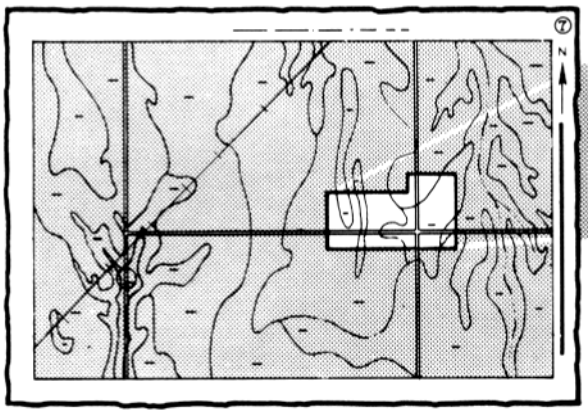

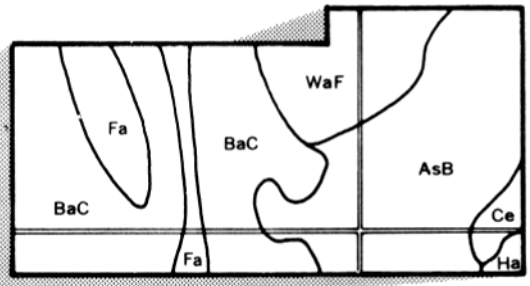

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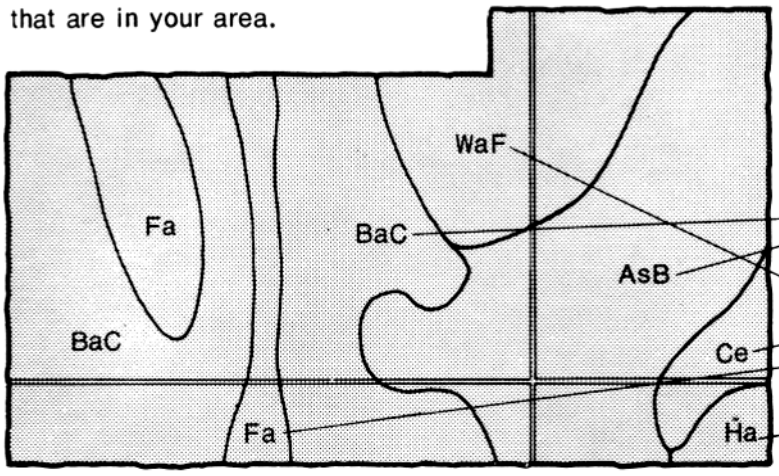
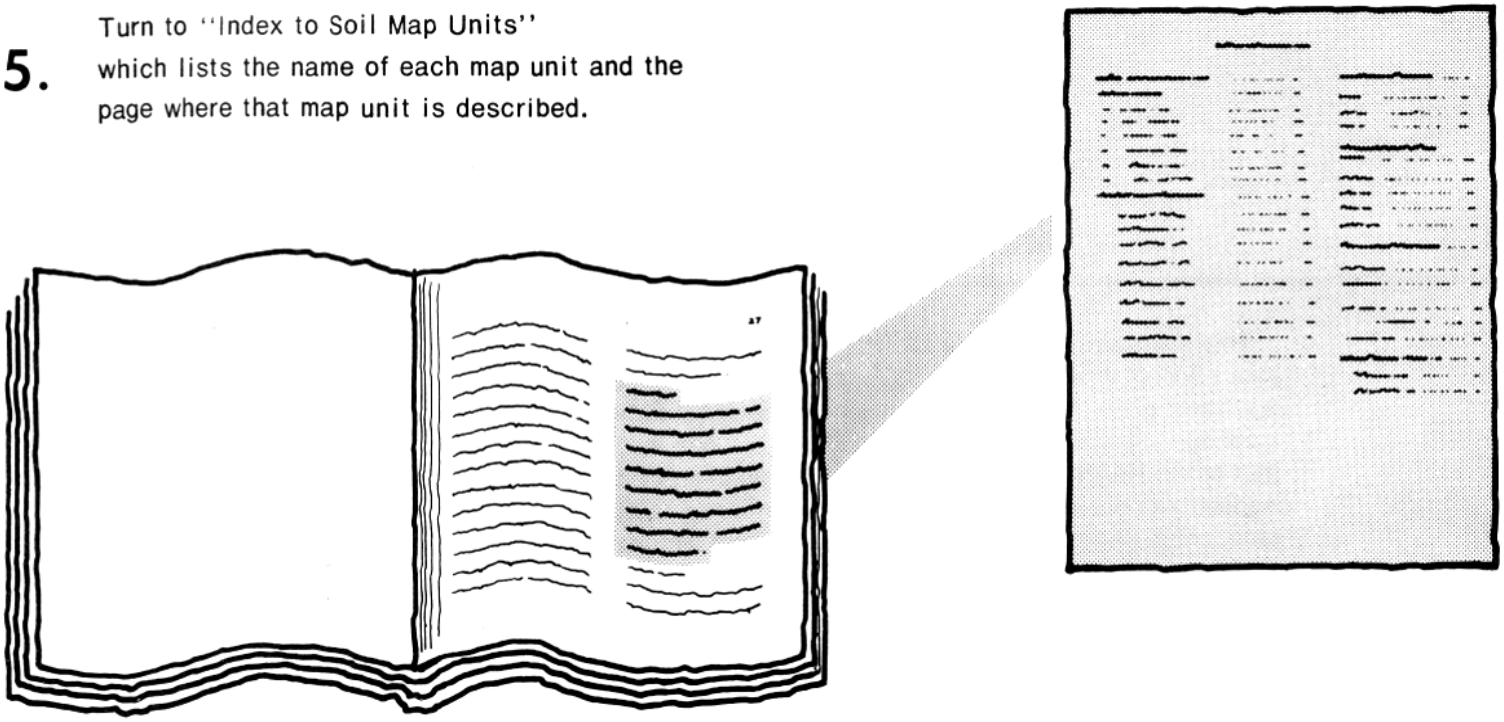


Symbols

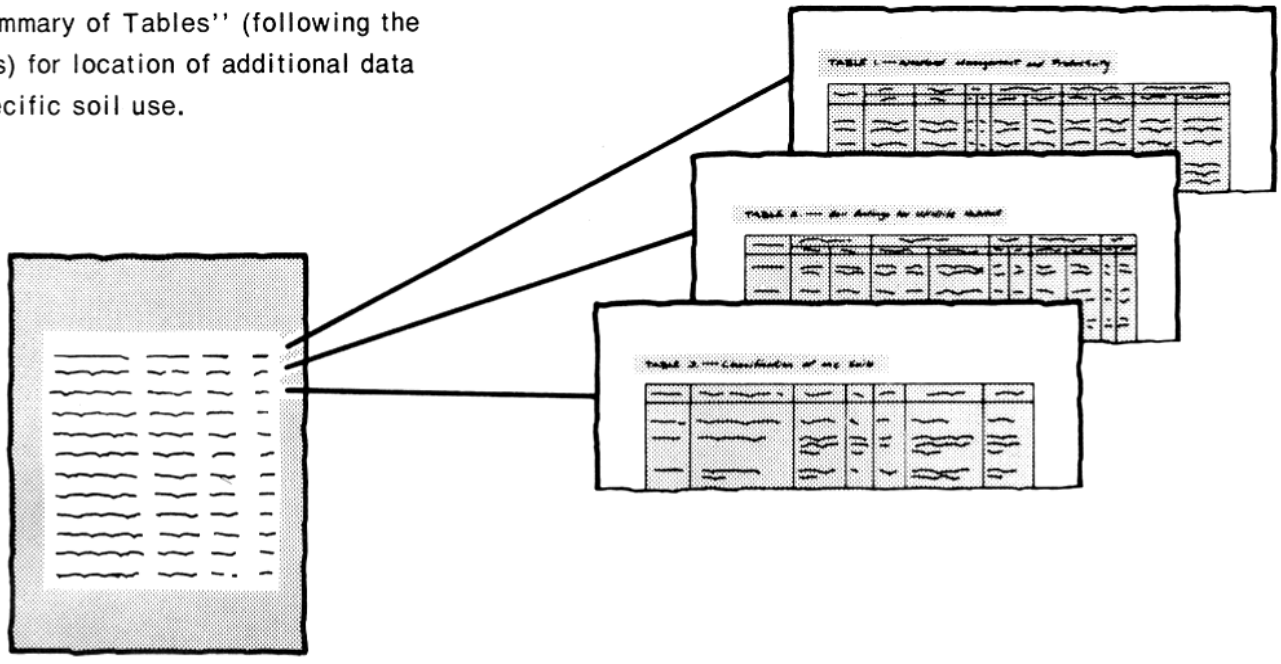
AsB
BaC
Ce
Fa
Ha
WaF

THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1971-75. Soil names and descriptions were approved in 1979. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1977. This survey was made cooperatively by the Soil Conservation Service and the College of Agricultural Sciences, University of Puerto Rico, Mayaguez Campus. The survey is part of the technical assistance furnished to the Atlantico, Caonillas, and Norte Soil Conservation Districts.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: An area of pineapples on Vega Alta sandy clay loam, 2 to 5 percent slopes.

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foreword

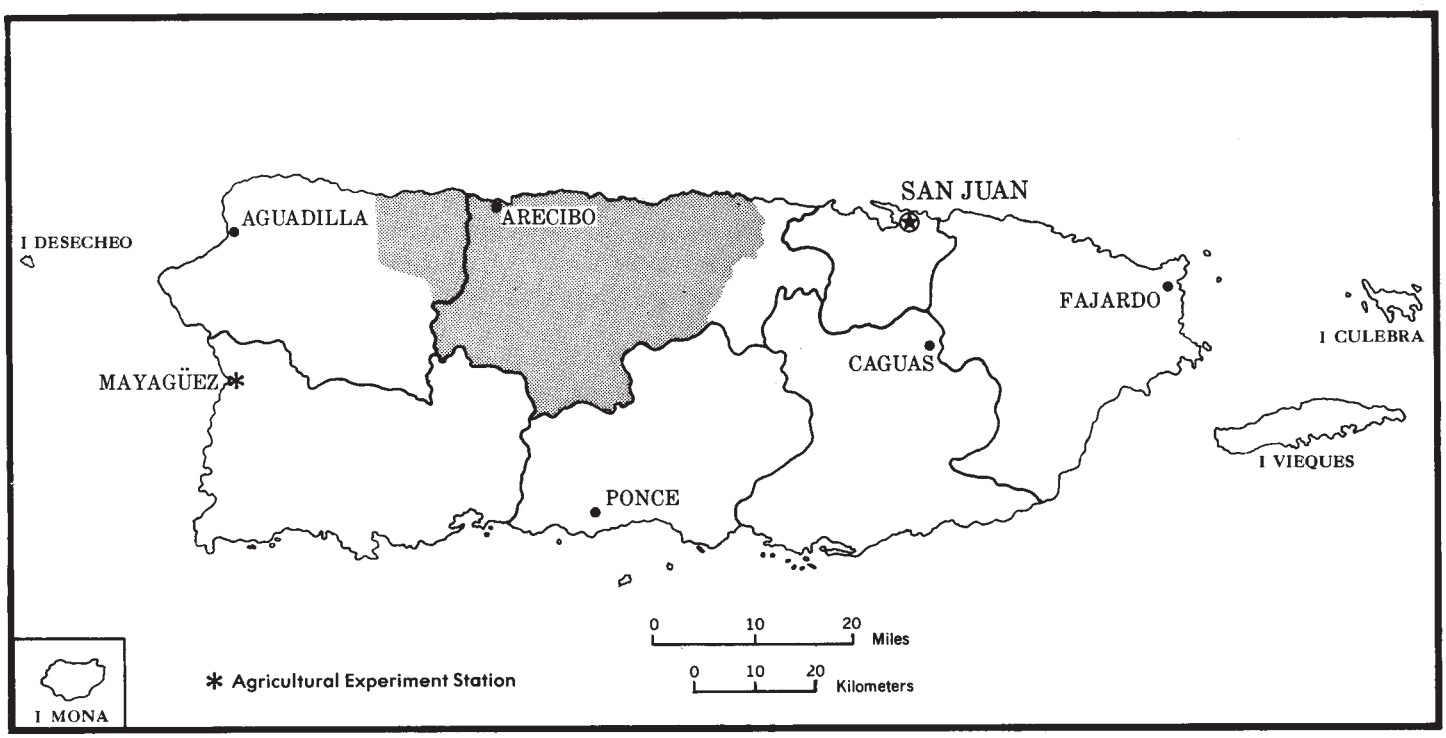
This soil survey contains information that can be used in land-planning programs in the Arecibo Area. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Ivan R. Emmanuelli
Director
Soil Conservation Service



Location of the Arecibo Area of Northern Puerto Rico.

soil survey of
Arecibo Area of Northern Puerto Rico

By Gilberto Acevido, Soil Conservation Service

Fieldwork by Roberto E. Gierbolini, Joaquin Torres-Mas, Angel Santana
William Francia-Rivera, Julio E. Trigo, G. Torres-Ricci, and
Luis H. Rivera, Soil Conservation Service

United States Department of Agriculture
Soil Conservation Service
in cooperation with
the College of Agricultural Sciences
University of Puerto Rico, Mayaguez Campus

THE ARECIBO AREA is in the north-central part of Puerto Rico and consists of 402,384 acres, or about 629 square miles. Arecibo, which is 48 miles west of San Juan, is the largest city in the survey area.

The survey area is made up of three major physiographic regions: (1) the nearly level to sloping coastal plains, including the alluvial flood plains along the Arecibo, Manati, and Camuy Rivers, cover 24 percent of the area; (2) the limestone upland hills (haystacks), which have a karst topography on the north coast, make up about 40 percent of the survey area; and (3) the volcanic and intrusive upland hills in the southern part of the survey area cover about 34 percent of the acreage. The highest point in the Arecibo Area, an altitude of 4,398 feet above sea level, is in Cerro Punta. Two lakes in the central uplands, the Dos Bocas (557 acres) and the Caonillas (503 acres), and the Tortuguero Lagoon (658 acres) on the northern coastal plain are the main bodies of fresh water in the survey area.

The population of the Arecibo Area is about 480,900, many of whom are employed by agricultural enterprises. The 319 dairy farms in the area produce about 45 percent—155 million quarts per year—of the total milk production in Puerto Rico. The pineapple production is about 40,000 tons per year, which is 90 percent of Puerto Rico's total. Other major crops in the area are sugarcane, coffee, tobacco, citrus fruits, plantains, taniers, and yams. Pangolagrass and stargrass are used for improved pasture for beef and dairy cattle, and some farms produce hay. The cultivation of flooded rice is underway on the coastal plains.

Some of the major nonfarm industries in the area are the production and processing of pharmaceuticals, paper, and petrochemicals and the canning of vegetables, coffee, and fruit.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

The Arecibo Area has hot days during most months except January and February, and nights are warm all year. In the mountains of the interior, temperatures are appreciably lower than elsewhere, but freezing temperatures are unknown anywhere in the area. Rainfall is abundant in most of the survey area throughout the year but is at a minimum in February and March.

Tables 1 and 2 give data on temperature and precipitation for the survey area as recorded at Arecibo on the northern coast and precipitation data as recorded

in the mountains at Adjuntas. Further precipitation data are given for the Adjuntas substation in table 3.

In winter at Arecibo the average temperature is 75 degrees F, and the average daily minimum temperature is 65 degrees. The lowest temperature on record, which occurred at Arecibo on July 2, 1974, is 55 degrees. In summer the average temperature is 80 degrees, and the average daily maximum temperature is 90 degrees. The highest recorded temperature, which occurred on August 4, 1972, is 97 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (60 degrees F).

Of the total annual precipitation, 27 inches, or 50 percent, usually falls at Arecibo in April through September, which includes the growing season for most crops. During this same April through September period, 52 inches, or 65 percent, of the annual precipitation is recorded at Adjuntas 1NW. In 2 years out of 10, the rainfall in April through September is less than 22 inches at Arecibo and less than 41 inches at Adjuntas 1NW. The heaviest 1-day rainfall during the period of record was 9 inches at Arecibo on September 17, 1975, and 12.8 inches at Adjuntas 1NW on September 16, 1975. Thunderstorms occur on about 40 days each year, and most occur in summer.

The average relative humidity in midafternoon is about 70 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 60 percent of the time possible in summer and winter. The prevailing wind is from the northeast. Average windspeed is highest, 14 miles per hour, in July.

From June through November, an occasional tropical depression skirts or crosses the area and heavy rainfall causes severe flooding. Every 10 to 20 years, a hurricane causes wind damage as well as flooding.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby areas and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

soils on coastal plains

Most of the soils in this group are nearly level to sloping and are in small valleys on coastal plains and in depressional areas and lagoons. Many of the soils are well suited to and used for cultivated crops.

1. Algarrobo-Corozo-Arecibo association

Deep, gently sloping to sloping, excessively drained and well drained, sandy soils

This association is on the coastal plains between the towns of Manati and Dorado. The association covers about 1 percent of the survey area. Algarrobo soils make up about 45 percent of the association, Corozo soils 37 percent, Arecibo soils 13 percent, and minor soils 5 percent.

The Algarrobo and Arecibo soils are excessively drained. The Corozo soils are well drained.

The minor soils are Tropopsamments, Hydraquents, and Coastal beaches. Tropopsamments are on small hills and ridges along the coast. Hydraquents are in depressions or lagoons. Coastal beaches consist of nearly level, narrow strips of fine sand along the coast.

This association is used mainly for pasture and coconuts. Low fertility, high acidity, and low available water capacity are the main limitations for cultivated crops.

The association has few limitations as a site for buildings and roads, and the soils are a good source of roadfill. These soils have been used as a source of sand for industrial purposes.

2. Guerrero-Carrizales-Jobos association

Deep, gently sloping to sloping, excessively drained and moderately well drained, sandy and loamy soils

This association is on the coast between the towns of Camuy and Barceloneta. The association covers about 3 percent of the survey area. Guerrero soils make up 37 percent of the association, Carrizales soils 31 percent, Jobos soils 25 percent, and minor soils 7 percent.

The Guerrero soils are excessively drained and have a sandy surface layer. The Carrizales soils are excessively drained and are sandy throughout. The Jobos soils are moderately well drained and have a loamy surface layer.

The minor scils are Rio Lajas sand and Catano sand.

This association is used mainly for pasture, coconuts, and food crops. Supplemental irrigation is necessary in areas used for food crops.

The association is generally suitable as a site for buildings and roads.

3. Almirante-Espinosa-Vega Alta association

Deep, gently sloping to sloping, well drained, loamy and clayey soils

This association is in an area between the towns of Vega Alta and Camuy. It is on limestone hills and is on terraces along the coast. The association covers about 8 percent of the survey area. Almirante soils make up about 45 percent of the association, Espinosa soils 30 percent, Vega Alta soils 15 percent, and minor soils 10 percent.

The Almirante and Vega Alta soils are clayey, and the Espinosa soils are loamy.

The minor soils in this association are moderately deep Islote soils and highly weathered Bayamon soils. Exposed limestone bedrock is in a few areas.

This association is used mainly for sugarcane, food crops, pineapples, and pasture. The association is suitable for cultivated crops and is generally suitable for nonfarm development.

4. Bayamon-Matanzas association

Deep, gently sloping to sloping, well drained, clayey soils

This association is mainly in the southern part of the Cano Tiburones area, near the towns of Manati and Vega Baja, and is in the southwestern part of the town of Arecibo and in the town of Vega Alta. The acreage is in small valleys between limestone hills and on the coastal plains. The association makes up 7 percent of the survey area. Bayamon soils make up about 95 percent of the association, Matanzas soils 3 percent, and minor soils 2 percent.

The Bayamon soils have bedrock at a depth of 60 inches or more, but limestone bedrock is at a depth of less than 60 inches in the Matanzas soils.

The most extensive minor soils in this association are Almirante soils. Some areas have limestone bedrock exposed at the surface.

This association is mainly used for sugarcane, pineapples, and pasture. It is suitable for cultivated crops, but the clayey texture of the soils and the depth to rock in the Matanzas soils limit some types of nonfarm development.

5. Tiburones-Palmar-Garrochales association

Deep, nearly level, poorly drained, mucky soils

This association is on flats and in depressional areas along the coast. Most of the acreage is between the towns of Arecibo and Manati, but a small area is near the town of Vega Baja. This association covers about 1 percent of the survey area. Tiburones soils make up about 65 percent of the association, Palmar soils 20 percent, Garrochales soils 10 percent, and minor soils 5 percent.

The Tiburones, Palmar, and Garrochales soils are deep, poorly drained, and acid. They formed in organic material. The minor soils in the association are organic Vigia soils and mineral Jareales soils.

This association is used mainly for pasture. Some small areas are in sugarcane, and some areas are in swamps. Wetness, a high water table, and poor tilth are the main limitations of these soils for cultivated crops. Wetness and poor soil stability are the major limitations for nonfarm development. The suitability of the soils for wildlife habitat is good.

soils on flood plains

Most of these soils are nearly level. The soils are along the rivers and streams of the coastal plains and are in land valleys. Sugarcane, cultivated crops, and improved pasture cover much of the area, and these soils generally have good potential for farming.

6. Toa-Coloso-Bajura association

Deep, nearly level, well drained to poorly drained, loamy to clayey soils

This association is in the southern part of the town of Arecibo and near the towns of Manati and Vega Baja. The association covers 4 percent of the survey area. Toa soils make up about 37 percent of the association, Coloso soils 34 percent, Bajura soils 19 percent, and minor soils 10 percent.

The Toa soils in this association are well drained and are at the highest elevations. The Coloso soils are somewhat poorly drained and are at intermediate positions. The Bajura soils are poorly drained and are at the lowest elevations.

The minor soils consist mainly of Reilly and Vivi soils. Both are nearly level and well drained.

The soils of this association are mainly used for sugarcane but are suitable for other cultivated crops. A flooding hazard and the clayey texture and slow drainage of some of the soils are the main limitations for farming and nonfarm use.

soils on uplands

Most of the soils in this group are gently sloping to very steep. The soils are mostly used for cultivated crops, coffee, and improved pasture and are generally suitable for farming.

7. Rock outcrop-Tanama-San Sebastian association

Rock outcrop and shallow to deep, sloping to very steep, well drained, clayey soils

This association is between the town of Vega Alta and the towns of Ciales, Utuado, and Camuy. The association covers about 21 percent of the survey area. The Rock outcrop-Tanama complex makes up about 40 percent of the association, Tanama soils 30 percent, San Sebastian soils 25 percent, and minor soils 5 percent.

Rock outcrop mainly consists of exposed limestone bedrock. The Tanama soils are shallow to limestone bedrock. The San Sebastian soils are deep.

The minor soils are Soller, San German, and Colinas soils.

Pasture is the major use of this association. Some areas are in brush and hardwoods. The major limitations for nonfarm development are slope, the areas of exposed rock, and depth to the limestone rock. The association is well suited for woodland and wildlife habitat.

8. Moca-Perchas association

Deep, gently sloping to steep, moderately well drained and poorly drained, clayey soils

This association is the area of Wards Quebrada, Bayaney, Aibonito, Angeles, and Barahona. The association makes up about 2 percent of the survey area. Moca soils make up about 60 percent of the association, Perchas soils 30 percent, and minor soils 10 percent.

The Moca soils are moderately well drained, and the Perchas soils are poorly drained. The minor soils are Naranjo and Colinas soils on side slopes and ridgetops.

This association is mainly used for pasture and sugarcane. Some areas are in food crops. The clayey texture and the permeability and drainage of the soils are the main limitations for farming. The texture, drainage, and slope of the soils are the main limitations for nonfarm development.

9. Humatas-Los Guineos-Alonso association

Deep, moderately steep to very steep, well drained and moderately well drained, clayey soils

This association is mainly on side slopes and ridgetops in the mountainous southeastern part of the survey area. A small area is in the southwestern part. The association makes up about 14 percent of the survey area. Humatas soils make up about 55 percent of the association, Los Guineos soils 25 percent, Alonso soils 10 percent, and minor soils 10 percent.

The Humatas and Alonso soils are well drained, and the Los Guineos soils are moderately well drained. The minor soils are Consumo and Daguey soils.

This association is used mainly for coffee, food crops, and pasture. Some small areas are in sun-grown coffee and brush. Slope and an erosion hazard are the main limitations for cultivation, but the soils are generally suitable for farming and woodland. Slope and the clayey texture are the main limitations for nonfarm development.

10. Pellejas-Lirios-Ingenio association

Deep, sloping to very steep, well drained, loamy soils

This association is mainly in the vicinity of the towns of Utuado and Jayuya. A small area is near the towns of Ciales and Morovis. The association makes up about 12 percent of the survey area. Pellejas soils make up about 54 percent of the association, Lirios soils 35 percent, Ingenio soils 6 percent, and soils of minor extent 5 percent.

The Pellejas soils are on side slopes and ridgetops, the Lirios soils are on side slopes, and the Ingenio soils are on ridgetops. The minor soils are Adjuntas, Consejo, and Vivi soils. The Adjuntas and Consejo soils are near copper mines, and the Vivi soils are near rivers and streams.

This association is used mainly for coffee, food crops, and pasture. Some small areas are in woodland. Slope is the main limitation for nonfarm use.

11. Mucara-Morado-Maraguez association

Moderately deep and deep, moderately steep to very steep, well drained, clayey to loamy soils

This association is on mountainous ridgetops, side slopes, and foot slopes mainly in the southeastern part of the survey area. Some small areas are near Lake Dos Bocas and Lake Caohillas. The association covers about 8 percent of the survey area. Mucara soils make up about 45 percent of the association, Morado soils 25 percent, Maraquez soils 20 percent, and soils of minor extent 10 percent.

The Mucara and Morado soils are moderately deep, and the Maraguez soils are deep. The soils of minor extent are mainly steep to very steep, shallow Caguabo soils.

This association is used mainly for coffee, food crops, and pasture, and the soils are suitable for woodland. Some of the acreage is in brush. Slope and the depth to bedrock are the main limitations for nonfarm development.

12. Colinas-Naranjo-Juncal association

Deep and moderately deep, moderately well drained and well drained, clayey to loamy soils

This association is on foot slopes, ridgetops, and side slopes. The association covers about 7 percent of the survey area. Colinas soils make up about 70 percent of the association, Naranjo soils 15 percent, Juncal soils 10 percent, and soils of minor extent 5 percent.

The Colinas soils are well drained and moderately deep, the Naranjo soils are well drained and deep, and the Juncal soils are moderately well drained and deep. The minor soils are shallow San German soils and moderately deep Soller soils.

This association is used mainly for pasture. Some areas are in sugarcane and food crops, and the soils are suitable for woodland. Slope is the main limitation of the soils for nonfarm development.

13. Soller-San German-Rock outcrop association

Shallow and moderately deep, sloping to very steep, well drained, loamy and clayey soils; rock outcrop

This association is mainly in the middle part of the survey area. The association covers about 12 percent of the survey area. The Soller-Rock outcrop complex makes up about 75 percent of the association, San German soils 20 percent, and soils of minor extent 5 percent.

The Soller soils are moderately deep, and the San German soils are shallow. The minor soils are moderately deep Colinas soils and deep Naranjo and Juncal soils.

Most areas of this association are used for pasture and food crops. Some areas are in brush, native pasture, and hardwoods. The association is well suited for pasture, woodland, and wildlife habitat. Slope and the depth to rock are the main limitations for nonfarm development.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, *Soller cobbly clay, 12 to 20 percent slopes,* is one of several phases in the Soller series.

Some map units are made up of two or more major soils. These map units are called soil complexes or soil associations.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. *Matanzas-Rock outcrop complex, 5 to 60 percent slopes,* is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. *Los Guineos-Maricao-Rock outcrop association, steep,* is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. *Riverwash* is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

soil descriptions

AaC—Aceitunas sandy clay loam, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and is on the coastal plains. Slopes range from about 100 to 500 feet in length. The areas range from 20 to 100 acres.

Typically, the surface layer is dark reddish brown sandy clay loam about 6 inches thick. The subsoil mainly is yellowish red and red clay that extends to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Coto soils, areas of exposed bedrock, and areas of sinkholes. Included areas make up 10 to 15 percent of the unit.

The permeability and available water capacity of this Aceitunas soil are moderate. Runoff and natural fertility are medium. Reaction in the surface layer and subsoil is very strongly acid or strongly acid.

This soil is well suited for sugarcane, plantains, sweet potatoes, pangolagrass, stargrass, and merkergrass, all of which respond well to lime and fertilizer. Minimum tillage and using cover crops and contour stripcropping help to reduce runoff and a moderate erosion hazard in

areas used for cultivated crops. Using proper stocking rates and deferred grazing and controlling weeds are some of the main pasture management concerns.

Slope is the main limitation of this soil for such nonfarm uses as septic tank absorption fields and as a building site.

The capability subclass is IIIe.

AcC—Aceitunas clay, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and is on the coastal plains. Slopes range from about 100 to 500 feet in length. The areas range from 20 to 100 acres.

Typically, the surface layer is dark reddish brown clay about 6 inches thick. The subsoil mainly is yellowish red and red clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Coto soils, areas of exposed bedrock, and areas of sinkholes. Included areas make up 10 to 15 percent of this unit.

The permeability and available water capacity of this Aceitunas soil are moderate. Runoff and natural fertility are medium. Reaction in the surface layer and subsoil is very strongly acid or strongly acid.

This soil is well suited for sugarcane, plantains, sweet potatoes, pangolagrass, stargrass, and merkergrass, all of which respond well to lime and fertilizer. Tilth can be improved by incorporating organic matter into the soil and tilling when the soil has the optimum moisture content. Using proper stocking rates and deferred grazing and controlling weeds are the main pasture management concerns.

The slope and clayey texture of this soil are the main limitations for nonfarm use, especially for septic tank absorption fields and as a building site.

The capability subclass is IIIe.

AdF2—Adjuntas clay, 40 to 60 percent slopes, eroded. This soil is moderately deep, very steep, and well drained. It is on side slopes and ridgetops on volcanic uplands. Slopes are 100 to 500 feet long. The areas range from 50 to 100 acres.

Typically, the surface layer is brown, firm clay about 5 inches thick. The subsoil is 19 inches thick. The upper 12 inches is brown, firm clay; the lower 7 inches is mixed yellow, white, and brownish yellow clay that is friable. The substratum is 24 inches of partially weathered rock. Semiconsolidated rock is at a depth of 48 inches.

Included with this soil in mapping are areas of Consejo, Consumo, and Humatas soils. Also included are areas of soils where erosion has removed most of the surface layer. Included areas make up 10 to 20 percent of the unit.

The permeability and available water capacity of this Adjuntas soil are moderate. Runoff is very rapid. The soil is medium in fertility. Reaction in the surface layer and subsoil is very strongly acid. The hazard of erosion is severe.

Slope and the erosion hazard make this soil poorly suited for cultivated crops. The soil, however, is well suited to such pasture plants as pangolagrass and stargrass. Liming helps to lower the acidity of the soil. Using proper stocking rates and deferred grazing and controlling weeds are the main pasture management concerns.

The soil is well suited to Honduras pine, but the slope is a major limitation for the use of harvesting equipment.

Slope also limits the soil for most types of nonfarm development. The soil is subject to landslides, and low strength limits excavations.

The capability subclass is VIIe.

AgC—Algarrobo fine sand, 2 to 12 percent slopes. This soil is deep, gently sloping to sloping, and excessively drained. It is on coastal plains. Slopes range from about 100 to 400 feet long. The areas of the soil range from 20 to 200 acres.

Typically, the surface layer is gray, loose fine sand about 11 inches thick. The subsurface layer is light gray, very friable fine sand 21 inches thick. The subsoil is 5 inches of black and brown, very friable sandy loam. The next 31 inches is extremely firm, gray and brown clay. The underlying layer is very firm sandy clay loam to a depth of 80 inches.

Included with this soil in mapping are areas of Corozo and Arecibo soils and soils from which the surface layer has been removed for industrial purposes. Included soils make up 10 to 15 percent of the unit.

The permeability of this Algarrobo soil is rapid in the upper part and slow in the lower part. The available water capacity is low. Runoff is slow, and tilth is good. Reaction in the surface layer and subsoil is extremely acid to strongly acid.

This soil is well suited for coconuts and for such pasture plants as pangolagrass and merkergrass. The major limitations are the low available water capacity, the acidity, and a low fertility level. Establishing and maintaining a mixture of pangolagrass and legumes, preventing overgrazing, using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil has few limitations for most types of nonfarm use.

The capability subclass is VIIs.

AlB—Almirante sandy loam, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 400 to 800 feet in length. The areas of the soil range from 50 to 300 acres.

Typically, the surface layer is dark yellowish brown, loose sandy loam about 6 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Espinosa and Bayamon soils that make up 10 to 15 percent of the unit.

The permeability of this Almirante soil is moderate. The available water capacity is low. Runoff is slow. Reaction of the surface layer and subsoil is very strongly acid. This soil is medium to low in natural fertility.

This soil is well suited for sugarcane, sweet potatoes, and pineapples. Low available water capacity, acidity, and a low to moderate fertility level are the main limitations. Supplemental irrigation is often necessary. The soil has good tilth, and crops respond well to lime and fertilizer.

The soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. The acidity and low available water capacity of the soil are the main limitations. Using proper stocking rates and deferred grazing, controlling weeds, and using lime and fertilizer are the main pasture management concerns.

This soil has few limitations for most types of nonfarm use.

The capability subclass is IIIs.

AlC—Almirante sandy loam, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 400 to 600 feet in length. The areas of the soil range from 30 to 300 acres.

Typically, the surface layer is dark yellowish brown, loose sandy loam about 6 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Espinosa and Bayamon soils that make up 10 to 15 percent of the unit.

The permeability of this Almirante soil is moderate, and the available water capacity is low. The subsoil has moderate permeability and moderate available water capacity. Runoff is medium. Reaction of the surface layer and subsoil is very strongly acid. Fertility is low to moderate.

This soil is suited for cultivated crops and is especially suitable for sugarcane, sweet potatoes, and pineapples. An erosion hazard, acidity, and the low available water capacity are the main limitations for crops and pasture. Applying lime and fertilizer, incorporating organic matter into the soil, and using supplemental irrigation are the main management practices for crops.

The soil is well suited for pasture plants such as pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, liming and fertilizing, and using supplemental irrigation are the main pasture management concerns.

Slope is the main limitation of this soil for most types of nonfarm use, especially for septic tank absorption fields and as a building site.

The capability subclass is IVe.

AmB—Almirante sandy clay loam, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 100 to 200 feet in length. The areas of the soil range from 20 to 80 acres.

Typically, the surface layer is dark yellowish brown, friable sandy clay loam about 6 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Espinosa and Bayamon soils that make up about 5 percent of the unit.

The permeability of this Almirante soil is moderate, and the available water capacity is moderate. Runoff is medium. The soil is medium in natural fertility. Reaction of the surface layer and the subsoil is very strongly acid. The hazard of erosion is moderate.

This soil is well suited for sugarcane, pineapples, plantains, and sweet potatoes. Crops on this soil respond well to lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. The major limitation is acidity. Using proper stocking rates and deferred grazing, controlling weeds, and using lime and fertilizer and supplemental irrigation are the main pasture management concerns.

This soil has few limitations for most types of nonfarm use.

The capability subclass is IIe.

AmC—Almirante sandy clay loam, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 100 to 300 feet in length. The areas of the soil range from 20 to 150 acres.

Typically, the surface layer is dark yellowish brown, friable sandy clay loam about 6 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Espinosa and Bayamon soils that make up about 5 percent of the unit.

The permeability of this Almirante soil is moderate, and the available water capacity is moderate. Runoff is medium. This soil is medium in natural fertility. Reaction of the surface layer and subsoil is very strongly acid.

This soil is well suited for cultivated crops such as sugarcane, pineapples, sweet potatoes, and plantains. Crops respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as stargrass, merkergrass, and pangolagrass. Applying lime and fertilizer, using proper stocking rate and deferred grazing, and controlling weeds are the main pasture management concerns.

Slope is the main limitation of this soil for nonfarm use, especially for septic tank absorption fields and as a building site.

The capability subclass is IIIe.

AnB—Almirante clay, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 400 to 700 feet in length. The areas of the soil range from 20 to 400 acres.

Typically, the surface layer is dark yellowish brown, firm clay about 6 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Espinosa and Bayamon soils that make up 10 to 15 percent of the unit.

The permeability of this Almirante soil is moderate, and the available water capacity is moderate. Runoff is medium. Reaction of the surface layer and subsoil is very strongly acid. Fertility is medium. The hazard of erosion is slight to moderate.

This soil is well suited for sugarcane, pineapples, sweet potatoes, and plantains. Crops respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

The clayey texture of this soil is the main limitation for nonfarm use.

The capability subclass is IIe.

AnC—Almirante clay, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 200 to 600 feet in length. The areas of the soil range from 20 to 300 acres.

Typically, the surface layer is dark yellowish brown, firm clay about 6 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Espinosa and Bayamon soils that make up 10 to 15 percent of the unit.

The permeability of this Almirante soil is moderate, and the available water capacity is moderate. Runoff is medium. Reaction of the surface layer and subsoil is very strongly acid. This soil is medium in natural fertility.

This soil is well suited for sugarcane, pineapples, sweet potatoes, and plantains. Crops respond well to applications of lime and fertilizer. Tillage is somewhat limited by the high clay content of the soil.

The soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Applying lime and fertilizer, using proper stocking rates and deferred grazing, and controlling weeds are the main pasture management concerns.

Slope and the clayey texture of the soil are the main limitations for nonfarm use.

The capability subclass is IIIe.

AoD2—Alonso clay, 12 to 20 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on side slopes, foot slopes, and ridgetops on the humid volcanic uplands. Slopes are 100 to 300 feet long. The areas of the soil range from 20 to 50 acres.

Typically, the surface layer is dark reddish brown clay about 7 inches thick. The subsoil is reddish brown clay 38 inches thick. The upper 16 inches of the subsoil is firm, and the lower 22 inches is firm to friable. The substratum is red, gray, and brown clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Humatas soils that make up 10 to 15 percent of the unit.

The permeability of this Alonso soil is moderate, and the available water capacity is high. Runoff is rapid. Natural fertility is medium. Reaction throughout the soil is very strongly acid.

This soil is well suited for cultivated crops such as plantains, coffee, taniers, and yams. Crops respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass, molassesgrass, and merkergrass. Applying lime and fertilizer, using proper stocking rates and deferred grazing, and controlling weeds are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus. Slope limits the use of harvesting equipment.

Slope is the main limitation of this soil for nonfarm use, especially for septic tank absorption fields and as a building site.

The capability subclass is IIIe.

AoE2—Alonso clay, 20 to 40 percent slopes, eroded. This soil is deep, steep, and well drained. It is on sides slopes and ridgetops on the humid volcanic uplands. Slopes are 100 to 800 feet long. The areas of the soil range from 20 to 300 acres.

Typically, the surface layer is dark reddish brown clay about 7 inches thick. The subsoil is reddish brown clay 38 inches thick. The upper 16 inches of the subsoil is firm, and the lower 22 inches is firm to friable. The substratum is red, gray, and brown clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Humatas soils and areas of Alonso soils with slopes of more than 40 percent. Included soils make up 5 to 10 percent of the unit.

The permeability of this Alonso soil is moderate, and the available water capacity is high. Runoff is rapid. Reaction throughout the soil is very strongly acid.

Slope, rapid runoff, and an erosion hazard limit this soil for cultivated crops, but some areas have been used

for shade-grown coffee, plantains, taniers, bananas, and oranges. Tillage is further restricted by the clayey texture of the soil. Crops on this soil respond well to lime and fertilizer.

This soil is well suited for pangolagrass, molassesgrass, stargrass, and merkergrass. Using a controlled stocking rate and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

Honduras pine and robusta eucalyptus are well suited to this soil, but slope limits the use of harvesting equipment.

Slope, the clayey texture, and low strength are the main limitations of the soil for nonfarm use. Road banks on this soil are unstable.

The capability subclass is IVe.

AoF2—Alonso clay, 40 to 60 percent slopes, eroded. This soil is deep, very steep, and well drained. It is on side slopes and ridgetops on uplands. Slopes are 100 to 800 feet long. The areas of the soil range from 20 to 400 acres.

Typically, the surface layer is dark reddish brown clay about 7 inches thick. The subsoil is reddish brown clay 38 inches thick. The upper 16 inches of the subsoil is firm, and the lower 22 inches is firm to friable. The substratum is brown, red, and gray clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Humatas soils that make up 5 to 15 percent of the unit.

The permeability of this Alonso soil is moderate, and the available water capacity is high. Runoff is very rapid. Reaction throughout the soil is very strongly acid.

Slope limits the use of equipment and makes this soil poorly suited for cultivated crops. Most areas are in shade-grown coffee, bananas, and oranges. Some small areas are in taniers, yams, and plantains.

The soil is well suited for pasture plants such as stargrass, pangolagrass, molassesgrass, and merkergrass. Using a controlled stocking rate and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of harvesting equipment. Controlling brush and fertilizing help to reduce seedling mortality.

Slope also limits this soil for most types of nonfarm use.

The capability subclass is VIe.

ArC—Arecibo fine sand, 2 to 12 percent slopes. This soil is deep, gently sloping to sloping, and excessively drained. It is on the coastal plains. Slopes range from 50 to 200 feet long. The areas of the soil range from 20 to 80 acres.

Typically, the soil is gray, white, and brown loose fine sand to a depth of 68 inches and black and brown stratified sand between depths of 68 and 74 inches. Stratified layers of brown and white loamy sand and sandy loam are at a depth of more than 74 inches.

Included with this soil in mapping are areas of Algarrobo and Corozo soils and areas of sand pits used for industrial purposes. Included areas make up 5 to 10 percent of the unit.

The permeability of this Arecibo soil is rapid, and the available water capacity is very low. Runoff is slow, and fertility is low. Reaction is very strongly acid.

This soil is well suited for such pasture plants as pangolagrass and merkergrass. The low available water capacity, strong acidity, and low fertility make the soil poorly suited for cultivated crops. Maintaining a mixture of legumes and pangolagrass, using proper stocking rates, controlling grazing and weeds, and liming and fertilizing are the main pasture management concerns.

This soil has few limitations for most types of nonfarm development, but some areas are subject to seepage.

The capability subclass is VIIs.

Ba—Bajura clay. This soil is deep, nearly level, and poorly drained. It is on flood plains. Slopes range from 300 to 2,000 feet long. The areas of the soil range from 50 to 800 acres.

Typically, the surface layer is very dark grayish brown, very firm clay about 7 inches thick. The subsoil is mottled, black, very firm clay 8 inches thick. The substratum is gray and yellowish brown, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Coloso soils and some wet spots. Included areas make up 10 to 15 percent of the unit.

The permeability of this Bajura soil is slow, and the available water capacity is high. Runoff is slow. Natural fertility and organic matter content are high. Reaction is slightly acid in the surface layer and neutral in the subsoil and substratum. The shrink-swell potential is high.

Drained areas of this soil are well suited for cultivated crops, mainly sugarcane; undrained areas are suitable for rice. The clayey texture makes the soil sticky and hinders tillage.

This soil is well suited for pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns. Controlled grazing is especially needed when the soil is wet.

Poor drainage, a flood hazard, and the high shrink-swell potential are the main limitations of the soil for nonfarm development.

The capability subclass is IIIw.

BcB—Bayamon sandy loam, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal

plains. Slopes range from 200 to 600 feet long. The areas of the soil range from 50 to 100 acres.

Typically, the surface layer is dark reddish brown and red, loose sandy loam about 11 inches thick. The subsoil is red, friable clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Almirante soils that make up 5 to 10 percent of the unit.

The permeability of this Bayamon soil is moderate. The available water capacity is moderate. Runoff is slow. Reaction is very strongly acid throughout. The soil is low in natural fertility.

This soil is well suited for pineapples, sweet potatoes, cassava, and sugarcane, especially if supplemental irrigation is used. Low available water capacity, strong acidity, and low fertility are the main limitations. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Strong acidity and low available water capacity are the major limitations. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil has few limitations for most types of nonfarm use.

The capability subclass is IIIs.

BcC—Bayamon sandy loam, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 200 to 1,000 feet long. The areas of the soil range from 50 to 100 acres.

Typically, the surface layer is dark reddish brown and red, loose sandy loam about 11 inches thick. The subsoil is red, friable clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Almirante soils that make up 5 to 15 percent of the unit.

The permeability of this Bayamon soil is moderate. The available water capacity is moderate. Runoff is medium. Reaction is very strongly acid throughout. Natural fertility is low.

This soil is suitable for cultivated crops, especially for sugarcane, sweet potatoes, cassava, and pineapples. An erosion hazard, strong acidity, and low available water capacity are the major limitations for cultivated crops. The main management practices include applying lime and using irrigation.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. The major limitations are the strong acidity and low available water capacity. Using proper stocking rates and deferred grazing, controlling weeds, liming and fertilizing, and providing irrigation are the main pasture management concerns.

Slope is the main limitation of the soil for nonfarm development.

The capability subclass is IVe.

BsB—Bayamon sandy clay loam, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 200 to 800 feet long. The areas of the soil range from 50 to 300 acres.

Typically, the surface layer is dark reddish brown and red sandy clay loam about 11 inches thick. The subsoil is red, friable clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Almirante soils that make up 5 to 15 percent of the unit.

The permeability and available water capacity of this Bayamon soil are moderate. Runoff is medium. This soil is very strongly acid throughout. Natural fertility is medium.

This soil is well suited for sugarcane, pineapples, sweet potatoes, and plantains. The soil has good tilth, and crops respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, liming and fertilizing, and providing irrigation during some dry periods are the main pasture management concerns.

This soil has few limitations for most types of nonfarm use.

The capability subclass is IIe.

BsC—Bayamon sandy clay loam, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is on the coastal plains and in small valleys between limestone hills. Slopes range from 200 to 1,000 feet long. The areas of the soil range from 50 to 400 acres.

Typically, the surface layer is dark reddish brown and red sandy clay loam about 11 inches thick. The subsoil is red, friable clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Almirante soils that make up 5 to 15 percent of the unit.

The permeability and available water capacity of this Bayamon soil are moderate. Runoff is medium. This soil is very strongly acid throughout. Fertility is medium.

This soil is well suited for pineapples, sugarcane, sweet potatoes, and plantains. The hazard of erosion and strong acidity are the main limitations. The soil has good tilth, and crops respond well to applications of lime and fertilizer. Irrigation is needed during some dry periods.

This soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Applying lime and fertilizer, using proper stocking rates and deferred grazing, and controlling weeds are the main pasture management concerns.

Slope is the main limitation of this soil for most types of nonfarm use.

The capability subclass is IIIe.

ByB—Bayamon clay, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in

small valleys between limestone hills and on the coastal plains. Slopes range from 200 to 1,500 feet long. The areas of the soil range from 50 to 500 acres.

Typically, the surface layer is dark reddish brown and red clay about 11 inches thick. The subsoil is red clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Almirante soils and areas of Matanzas soils that have limestone bedrock at a depth of less than 60 inches. Included soils make up 5 to 15 percent of the unit.

The permeability and available water capacity of this Bayamon soil are moderate. Runoff is slow. Reaction throughout the soil is very strongly acid. Natural fertility is medium.

This soil is well suited for cultivated crops, especially for pineapples, sugarcane, sweet potatoes, and plantains. Strong acidity is the main limitation. Crops on this soil respond to applications of lime and fertilizer.

The soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. The major limitation is strong acidity. Using proper stocking rates and deferred grazing, fertilizing and liming, and controlling weeds are the main pasture management concerns.

The clayey texture of the soil is the main limitation for nonfarm development.

The capability subclass is IIe.

ByC—Bayamon clay, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 50 to 200 feet long. The areas of the soil range from 30 to 300 acres.

Typically, the surface layer is dark reddish brown and red clay about 11 inches thick. The subsoil is red clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Almirante soils and areas of exposed bedrock and sinkholes. Included areas make up 5 to 10 percent of the unit.

The permeability and available water capacity of this Bayamon soil are moderate. Runoff is medium. Reaction throughout the soil is very strongly acid. Natural fertility is medium.

This soil is well suited for cultivated crops, especially for pineapples, sugarcane, sweet potatoes, and plantains. Strong acidity and slope are the main limitations. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Using proper stocking rates and deferred grazing, fertilizing and liming, and controlling weeds are the main pasture management concerns.

Slope and the clayey texture of the soil are the main limitations for nonfarm development.

The capability subclass is IIIe.

CaF—Caguabo clay loam, 20 to 60 percent slopes. This soil is shallow, steep to very steep, and well drained. It is on ridgetops and side slopes that are on volcanic uplands. Slopes range from 200 to 800 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is dark brown clay loam about 6 inches thick. The subsoil is dark yellowish brown gravelly clay loam 7 inches thick. The substratum is a mixture of highly weathered and partially weathered volcanic rock about 5 inches thick. Hard and semiconsolidated rock is at a depth of 18 inches.

Included with this soil in mapping are small areas of Mucara soils and small areas where the surface is covered by bedrock exposures or stones and boulders. Included areas make up 10 to 15 percent of the unit.

The permeability of this Caguabo soil is moderate, and the available water capacity is low. Runoff is rapid. Natural fertility is high, but the root zone is shallow. Reaction in the surface layer and subsoil is slightly acid.

Slope and the depth to rock make this soil poorly suited for cultivated crops, but a few small areas are in tobacco, food crops, bananas, and coffee. Slope hinders the use of some management practices, such as applying fertilizer.

The soil is well suited to stargrass, guineagrass, and pangolagrass. Using proper stocking rates and deferred grazing and fertilizing are the main pasture management concerns.

This soil is suitable for Honduras pine and robusta eucalyptus, but slope limits the use of harvesting equipment. Brush removal and fertilizing help to reduce the rate of seedling mortality.

Slope and the depth to rock limit this soil for most types of nonfarm development.

The capability subclass is VIIs.

CbF—Caguabo-Rock outcrop complex, 20 to 60 percent slopes. This complex consists of shallow, steep and very steep soils and areas of exposed bedrock. The complex is on side slopes and ridgetops on volcanic uplands. Slopes range from 200 to 800 feet long. The areas of the complex range from 80 to 400 acres. The complex is about 65 percent well drained Caguabo soils, 30 percent exposed rock, and 5 percent other soils. The Caguabo soils and exposed rock are so intricately mixed that it was not practical to map them separately.

Typically, the surface layer of the Caguabo soil is dark brown clay loam about 6 inches thick. The subsoil is yellowish brown gravelly clay loam 7 inches thick. The substratum is a mixture of highly weathered and partially weathered volcanic rock 5 inches thick. Hard and semiconsolidated rock is at a depth of 18 inches.

Included with this complex in mapping are mainly areas of Mucara soils.

The Caguabo soil in this complex has moderate permeability and low available water capacity. Runoff is

rapid, and the root zone is shallow. Reaction in the surface layer and subsoil is slightly acid.

Slope, the depth to rock, and the areas of exposed rock make this complex poorly suited for crops or pasture. The complex is suitable for Honduras pine and robusta eucalyptus, but the slope and exposed rock restrict the use of harvesting equipment.

Slope and the depth to rock limit this complex for most types of nonfarm development.

The capability subclass is VIIs.

CcD—Caracoles loam, 5 to 20 percent slopes. This soil is very shallow, sloping or moderately steep, and well drained. It is on side slopes and ridgetops along the coast. Slopes are 100 to 200 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is 6 inches of very dark grayish brown loam over semiconsolidated, calcareous sandstone.

Included with this soil in mapping are small areas of Islote soils and a few areas of exposed bedrock. Included areas make up 5 to 15 percent of the unit.

The permeability of this Caracoles soil is moderately rapid. The available water capacity is low. Runoff is medium. Reaction of the surface layer is neutral. The root zone is shallow, and fertility is medium.

The depth to rock and the low available water capacity make this soil poorly suited for farming. Some areas of the soil are droughty for long periods.

Slope and the depth to rock are the main limitations of the soil for most types of nonfarm development.

The capability subclass is VIs.

CcE—Caracoles loam, 20 to 40 percent slopes. This soil is very shallow, steep, and well drained. It is on side slopes and ridgetops along the coast. Slopes are 100 to 200 feet long. The areas of the soil range from 20 to 80 acres.

Typically, the surface layer is 6 inches of very dark grayish brown loam over semiconsolidated, calcareous sandstone.

Included with this soil in mapping are areas of exposed bedrock.

The permeability of this Caracoles soil is moderately rapid, and the available water capacity is low. Runoff is rapid. Reaction in the surface layer is neutral. Natural fertility is medium, and the root zone is shallow.

Slope, the depth to rock, and the low available water capacity make this soil poorly suited for farming. Some areas of the soil are droughty for long periods.

Slope and the depth to rock are the main limitations of the soil for most types of nonfarm development.

The capability subclass is VIIs.

CeC—Carrizales fine sand, 2 to 12 percent slopes. This soil is deep, gently sloping to sloping, and excessively drained. It is in small valleys and on hills on the coastal plains. Slopes range from 100 to 800 feet long. The areas of the soil range from 50 to 100 acres.

Typically, the surface layer is dark brown, loose fine sand about 8 inches thick. The substratum is brown and yellow, loose fine sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Jobos and Guerrero soils that make up 10 to 15 percent of the unit.

The permeability of this Carrizales soil is rapid, and the available water capacity is low. Runoff is slow. Reaction is strongly acid in the surface layer and very strongly acid in the substratum. Fertility is low.

This soil is suitable for cultivated crops but is limited by the low available water capacity, strong acidity, and rapid permeability. The soil is used for sweet potatoes, cassavas, and coconuts. Applying lime and fertilizer and providing irrigation are the main management concerns.

The soil is well suited for such pasture plants as stargrass and pangolagrass. The major limitations are strong acidity and low available water capacity. Using proper stocking rates and deferred grazing, controlling weeds, and using lime and fertilizer are the main pasture management concerns.

The sandy texture of the soil is the main limitation for nonfarm development, especially for septic tank absorption fields.

The capability subclass is VIs.

Cf—Catano sand. This soil is deep, nearly level, and excessively drained. It is in narrow strips along the coast. The areas range from 10 to 100 acres.

Typically, the surface layer is light gray and very dark grayish brown, loose sand about 5 inches thick. The subsoil is dark brown, loose sand 11 inches thick. The substratum is brown and gray, loose sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Coastal beaches and Tropopsamments, hummocky. The Coastal beaches consist of sand washed by sea waves and the Tropopsamments of sand hills that are drifted and piled by the wind. Included soils make up 5 to 10 percent of the unit.

The permeability of this Catano soil is rapid, and the available water capacity is low. Runoff is slow. Natural fertility is low.

This soil is poorly suited for cultivated crops but is well suited for pangolagrass and merkergrass. The major limitations for these pasture plants are the low available water capacity and low fertility. Applying fertilizer and using proper stocking rates and deferred grazing are the main pasture management concerns.

The texture limits this soil for some nonfarm uses, such as septic tank absorption fields, but the soil is a good source of industrial sand.

The capability subclass is VIs.

Cg—Coastal beaches. This unit consists of narrow strips of deep sand along the coast and a few small areas of Tropopsamments, hummocky.

This unit is unsuitable for most uses other than recreation. Coconut palms and salt-tolerant plants cover some areas of the unit, but most areas have no vegetation.

The capability subclass is VIIIs.

ClD2—Colinas clay loam, 12 to 20 percent slopes, eroded. This soil is moderately deep, moderately steep, and well drained. It is on the side slopes, ridgetops, and foot slopes of low, rolling hills. Slopes range from 200 to 500 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is very dark grayish brown, firm clay loam about 8 inches thick. The subsoil is dark brown, friable clay loam 6 inches thick. The substratum extends to a depth of 60 inches or more. It is light yellowish brown, friable clay loam to a depth of 21 inches and yellow and white soft limestone at a depth of more than 21 inches.

Included with this soil in mapping are small areas of Naranjo and Soller soils that make up 10 to 20 percent of the unit.

The permeability of this Colinas soil is moderate. The available water capacity is high. Runoff is rapid. The root zone is shallow, and natural fertility is medium. Reaction is moderately alkaline. Slippage of the soil is common in roadbanks, ditches, and drainageways.

The depth to limestone and the slope limit this soil for cultivated crops, but some small areas are used for sugarcane.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the chief pasture management concerns.

This soil is suitable for Honduras pine, Honduras mahogany, mahoe, and teak, but slope limits the use of equipment. Planting on the contour helps to reduce runoff and control erosion. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope is the main limitation of this soil for nonfarm development.

The capability subclass is IVe.

ClE2—Colinas clay loam, 20 to 40 percent slopes, eroded. This soil is moderately deep, steep, and well drained. It is on side slopes and ridgetops. Slopes range from 100 to 400 feet long. The areas of the soil range from 20 to 300 acres.

Typically, the surface layer is very dark grayish brown, firm clay loam about 8 inches thick. The subsoil is dark brown, friable clay loam 6 inches thick. The substratum extends to a depth of 60 inches or more. It is light yellowish brown, friable clay loam to a depth of 21 inches and yellow and white soft limestone at a depth of more than 21 inches.

Included with this soil in mapping are small areas of Soller and Naranjo soils and small areas from which the surface layer has been removed by erosion. Included areas make up 10 to 20 percent of the unit.

The permeability of this Colinas soil is moderate. The available water capacity is high. Runoff is rapid. The root zone is shallow, and natural fertility is medium. Reaction is moderately alkaline. Slippage of the soil is common in roadbanks, ditches, and drainageways.

Slope and the depth to limestone make this soil poorly suited for cultivated crops, but some areas are in sugarcane. Crops on the soil respond well to fertilizer applications, but cultivation is limited because the soil is sticky when wet.

The soil is suitable for such pasture plants as pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

This soil is suitable for Honduras mahogany, but slope limits the use of equipment. Planting on the contour helps to reduce runoff and control erosion. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and a susceptibility to landslides limit this soil for nonfarm development.

The capability subclass is VIe.

ClF2—Colinas clay loam, 40 to 60 percent slopes, eroded. This soil is moderately deep, very steep, and well drained. It is on side slopes and ridgetops. Slopes range from 100 to 300 feet long. The areas of the soil range from 20 to 500 acres.

Typically, the surface layer is very dark grayish brown, firm clay loam about 8 inches thick. The subsoil is dark brown, friable clay loam 6 inches thick. The substratum extends to a depth to 60 inches or more. It is light yellowish brown, friable clay loam to a depth of 21 inches and yellow and white soft limestone at a depth of more than 21 inches.

Included with this soil in mapping are small areas of Naranjo and Soller soils, areas from which the surface layer has been removed by erosion, and areas that have cobblestones on the surface. Included areas make up as much as 25 percent of the acreage of some units.

The permeability of this Colinas soil is moderate. The available water capacity is high. Runoff is very rapid. The root zone is shallow, and fertility is medium. Reaction is moderately alkaline. Slippage of this soil is common in roadbanks, ditches, and drainageways.

Slope and the depth to limestone make this soil poorly suited for cultivated crops, but some small areas are used for sugarcane, corn, pigeon peas, and other food crops. Crops on the soil respond well to applications of

fertilizer, but cultivation is limited because the soil is sticky when wet.

The soil is suited to such pasture plants as pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The soil is suited for Honduras mahogany, but slope limits the use of equipment. Planting on the contour helps to reduce runoff and control soil erosion. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and a susceptibility to landslides limit the soil for nonfarm development.

The capability subclass is VIIe.

CmF2—Colinas cobbly clay loam, 20 to 60 percent slopes, eroded. This soil is moderately deep, steep to very steep, and well drained. It is on side slopes and ridgetops. Slopes range from 100 to 400 feet long. The areas of the soil range from 20 to 500 acres.

Typically, the surface layer is very dark grayish brown, firm cobbly clay loam about 8 inches thick. The subsoil is dark brown, friable clay loam 6 inches thick. The substratum extends to a depth of 60 inches or more. It is light yellowish brown, friable clay loam to a depth of 21 inches and yellow and white soft limestone at a depth of more than 21 inches.

Included with this soil in mapping are small areas of Naranjo and Soller soils and small areas of exposed limestone bedrock. Included soils make up as much as 25 percent of the acreage of some units.

The permeability of this Colinas soil is moderate. The available water capacity is high. Runoff is very rapid. The root zone is shallow, and natural fertility is medium. Reaction is moderately alkaline. Slippage of the soil is common in roadbanks, ditches, and drainageways.

Slope, the depth to limestone, and the cobblestones in the surface layer make this soil poorly suited for cultivated crops. Some small areas are used for corn, pigeon peas, and other food crops, but the cultivation of such areas must be done by hand. Crops on the soil respond well to applications of fertilizers.

The soil is suitable for such pasture plants as pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

This soil is suitable for Honduras mahogany, but slope limits the use of equipment. Planting on the contour helps to reduce runoff and erosion. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope, the cobblestones in the surface layer, and a susceptibility to landslides limit this soil for nonfarm development.

The capability subclass is VIIe.

Cn—Coloso silty clay. This soil is deep, nearly level, and somewhat poorly drained. It is on flood plains. The areas range from 50 to 500 acres.

Typically, the surface layer is brown, firm silty clay about 7 inches thick. The subsoil is brown, firm, mottled clay 8 inches thick. The substratum extends to a depth of 60 inches or more. It is brown and gray, firm clay mottled with dark yellowish brown.

Included with this soil in mapping are small areas of Bajura and Toa soils. Also included are small areas of Coloso soils that are calcareous throughout. Included soils make up 10 to 15 percent of the unit.

The permeability of this Coloso soil is slow, and the available water capacity is high. Runoff is slow. Natural fertility and organic matter content are high. Reaction is slightly acid in the surface layer and neutral in the subsoil and substratum. The subsoil and substratum have a high shrink-swell potential.

Drained areas of this soil are well suited for cultivated crops, especially sugarcane. Undrained areas are suitable for rice (fig. 1). Crops on this soil respond well to applications of fertilizer.

The soil is well suited for stargrass, pangolagrass, and merkergrass, but drainage is needed. Using proper stocking rates, controlling weeds, fertilizing, and controlling grazing when the soil is wet are the main pasture management concerns.

A hazard of flooding and the high shrink-swell potential are the main limitations of the soil for nonfarm development.

The capability subclass is IIW.

CoE—Consejo clay, 20 to 40 percent slopes. This soil is deep, steep, and well drained. It is on side slopes and ridgetops on the humid volcanic uplands. Slopes are 100 to 300 feet long. The areas of the soil range from 10 to 50 acres.

Typically, the surface layer is dark brown and dark yellowish brown, firm clay about 5 inches thick. The subsoil is multicolored clay 23 inches thick. The upper 13 inches of the subsoil is firm, and the lower 10 inches is friable. The substratum is multicolored, friable clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Adjuntas, Consumo, and Humatas soils that make up to 10 to 15 percent of the unit.

The permeability of this Consejo soil is moderate. The available water capacity is high. Runoff is rapid. Reaction is extremely acid throughout. Slippage of the soil is common in roadbanks and drainageways.

This soil has been used for such crops as shade-grown coffee and plantains, taniers, yams, bananas, and oranges. Slope, rapid runoff, strong acidity, and an erosion hazard are the main limitations for cultivated crops. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for pangolagrass and stargrass. Using proper stocking rates and deferred grazing,

Figure 1.—An area of Coloso silty clay used for rice.

controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine, but slope limits the use of equipment. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope, the clayey texture, and a susceptibility to landslides limit this soil for most types of nonfarm development.

The capability subclass is IVe.

CoF—Consejo clay, 40 to 60 percent slopes. This soil is deep, very steep, and well drained. It is on side slopes and ridgetops on the humid volcanic uplands. Slopes are 200 to 800 feet long. The areas of the soil range from 10 to 200 acres.

Typically, the surface layer is dark brown and dark yellowish brown, firm clay about 5 inches thick. The subsoil is multicolored clay 23 inches thick. The upper 13 inches of the subsoil is firm, and the lower 10 inches is friable. The substratum is multicolored, friable clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Adjuntas and Consumo soils that make up 10 to 15 percent of the unit.

The permeability of this Consejo soil is moderate, and the available water capacity is high. Runoff is rapid. Reaction is extremely acid throughout. Slippage of the soil is common in ditches and drainageways.

Slope makes this soil poorly suited for cultivated crops. Some areas are used for shade-grown coffee and food crops, and crops on this soil respond well to applications of lime and fertilizers. However, the use of equipment is restricted.

This soil is well suited for such pasture plants as stargrass and pangolagrass. Using proper stocking rates

and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

The soil is well suited for Honduras pine, but slope limits the use of equipment. Controlling brush and weeds, hand planting, and fertilizing help to improve the rate of seedling survival.

Slope, the clayey texture, and a susceptibility to landslides limit the soil for most types of nonfarm development.

The capability subclass is VIe.

CpE—Consumo clay, 20 to 40 percent slopes. This soil is deep, steep, and well drained. It is on side slopes and ridgetops on the humid uplands. Slopes are 200 to 500 feet long. The areas of the soil range from 20 to 50 acres.

Typically, the surface layer is reddish brown, friable clay about 6 inches thick. The subsoil is red, firm clay 12 inches thick. The substratum is multicolored, friable silty clay loam to a depth of 50 inches or more.

Included with this soil in mapping are small areas of Humatas soils that make up 5 to 10 percent of the unit.

The permeability and available water capacity of this Consumo soil are moderate. Runoff is rapid. Natural fertility is medium. Reaction is very strongly acid throughout. Slippage of the soil is common in ditches and drainageways.

Slope, rapid runoff, and erosion are the main limitations of this soil for cultivated crops. The soil is well suited for shade-grown coffee, and some areas are used for food crops such as taniers, yams, and bananas. Crops on this soil respond well to applications of lime and fertilizer, but the clayey texture hinders cultivation.

This soil is well suited for pangolagrass, molassesgrass, and stargrass. Using a controlled stocking rate and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

The soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Controlling brush and weeds, hand planting, and fertilizing help to reduce the rate of seedling mortality.

Slope, the clayey texture, and a susceptibility to landslides limit this soil for nonfarm development.

The capability subclass is VIe.

CpF—Consumo clay, 40 to 60 percent slopes. This soil is deep, very steep, and well drained. It is on side slopes and ridgetops on the humid uplands. Slopes are 200 to 1,000 feet long. The areas of the soil range from 50 to 300 acres.

Typically, the surface layer is reddish brown, friable clay about 6 inches thick. The subsoil is red, firm clay 12 inches thick. The substratum is multicolored, friable silty clay loam to a depth of 50 inches or more.

Included with this soil in mapping are small areas of Humatas soils and small areas of Consumo soils that have slopes of less than 40 percent or that are severely eroded. Included soils make up 10 to 15 percent of the unit.

The permeability and available water capacity of this Consumo soil are moderate. Runoff is very rapid. Natural fertility is medium.

Slope, very rapid runoff, and an erosion hazard are the main limitations of this soil for cultivated crops. Some areas have been used for shade-grown coffee, oranges, and bananas. Crops on the soil respond well to applications of lime and fertilizer, but such applications are limited by slope and the clayey texture hinders cultivation.

The soil is well suited for pangolagrass, stargrass, and molassesgrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Controlling brush and weeds, hand planting, and fertilizing help to reduce the rate of seedling mortality.

Slope, the clayey texture, and a susceptibility to landslides are the main limitations of the soil for nonfarm development.

The capability subclass is VIIe.

CrC—Corozal clay, 5 to 12 percent slopes. This soil is deep, sloping, and somewhat poorly drained. It is on hilltops and small terraces. Slopes are 200 to 400 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is 6 inches of reddish brown, friable clay mottled with grayish brown. The subsoil is 35 inches thick. It is red and yellowish brown, mottled clay that is firm in the upper 7 inches. The substratum is multicolored, highly weathered saprolite to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Daguey soils and small areas of Corozal soils that have slopes of 12 to 20 percent. Included soils make up 10 to 15 percent of the unit.

The permeability of this Corozal soil is slow, and the available water capacity is high. Runoff is medium. Reaction is very strongly acid in the surface layer and extremely acid in the lower layers. Natural fertility is medium.

This soil is well suited for such crops as plantains and taniers. Erosion and strong acidity are the main limitations, and the clayey texture hinders cultivation. Crops on this soil respond well to lime and fertilizer.

This soil is well suited for such pasture plants as stargrass and pangolagrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

The clayey texture, wetness, and a shrink-swell potential limit this soil for most types of nonfarm development.

The capability subclass is IIIe.

CsC—Corozo fine sand, 2 to 12 percent slopes. This soil is deep, gently sloping to sloping, and well drained. It is on the coastal plains. Slopes range from about 100 to 400 feet long. The areas of the soil range from 20 to 200 acres.

Typically, the surface layer is gray, loose fine sand about 4 inches thick. The subsurface layer is gray, loose sand 14 inches thick. The subsoil is multicolored and extends to a depth of 60 inches or more. It is sandy loam to a depth of 24 inches; firm clay between depths of 24 and 33 inches; and firm loamy sand and sandy loam at a depth of more than 33 inches.

Included with this soil in mapping are areas of Algarrobo soils and areas where the subsoil is exposed. Included areas make up 5 to 10 percent of the unit.

The permeability of this Corozo soil is rapid in the surface and subsurface layers and slow in the subsoil. The available water capacity is low. Runoff is slow. Reaction is very strongly acid throughout. Natural fertility is low.

The low fertility level and low available water capacity make this soil poorly suited for cultivated crops. The soil is well suited for such pasture plants as pangolagrass and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the chief pasture management concerns.

This soil has few limitations for most types of nonfarm development, but the sandy texture causes a hazard of seepage.

The capability subclass is VIs.

CtB—Coto clay, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on coastal plains. Slopes are 200 to 400 feet long. The areas of the soil range from 5 to 20 acres.

Typically, the surface layer is dark reddish brown, firm clay about 8 inches thick. The subsoil extends to a depth of 75 inches. It is multicolored clay that is mottled in the lower part.

Included with this soil in mapping are small areas of Espinosa soils and exposed limestone bedrock. Included areas make up about 5 to 10 percent of the unit.

The permeability of this Coto soil is moderate, and the available water capacity is high. Runoff is medium. Reaction is very strongly acid in the surface layer and strongly acid in the subsoil. Natural fertility is medium.

This soil is well suited for sugarcane, plantains, sweet potatoes, tobacco, corn, and pigeon peas. It is used for papaya, citrus fruits, West Indian cherries, and avocados. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

Low strength and the clayey texture are the main limitations of this soil for nonfarm development.

The capability subclass is IIe.

CtC—Coto clay, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on coastal plains. Slopes are 100 to 300 feet long. The areas of the soil range from 5 to 9 acres.

Typically, the surface layer is dark reddish brown, firm clay about 8 inches thick. The subsoil extends to a depth of 75 inches. It is multicolored clay that is mottled in the lower part.

Included with this soil in mapping are small areas of exposed limestone bedrock that make up 5 to 10 percent of the unit.

The permeability of this Coto soil is moderate, and the available water capacity is high. Runoff is medium. Reaction is very strongly acid in the surface layer and strongly acid in the subsoil. Natural fertility is medium.

This soil is well suited for such cultivated crops as sugarcane, plantains, sweet potatoes, tobacco, corn, and pigeon peas. It is used for papaya, citrus fruits, West Indian cherries, and avocados. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture concerns.

Slope and the clayey texture limit this soil for nonfarm development.

The capability subclass is IIIe.

CuF—Cuchillas silty clay loam, 40 to 60 percent slopes. This soil is moderately deep, very steep, and well drained. It is on side slopes and ridgetops on the humid volcanic uplands. Slopes are 100 to 500 feet long. The areas of the soil range from 50 to 200 acres.

Typically, the surface layer is dark brown, firm silty clay loam about 6 inches thick. The subsoil is dark yellowish brown, firm silty clay loam 10 inches thick. The substratum is dark yellowish brown, firm clay loam 12 inches thick. Semiconsolidated volcanic rock is at a depth of 28 inches.

Included with this soil in mapping are small areas of Maricao soils, areas of severely eroded soils, and areas of exposed bedrock. Included areas make up 5 to 10 percent of the map unit.

The permeability of this Cuchillas soil is moderate, and the available water capacity is high. Runoff is very rapid. Natural fertility is high. Reaction in the surface layer and subsoil is strongly acid.

Slope, rapid runoff, and an erosion hazard make this soil poorly suited for cultivated crops. Some small areas are in coffee, but most of the cultivation must be done by hand.

The soil is well suited for pangolagrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the chief pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Removing brush and applying fertilizer help to reduce the rate of seedling mortality.

Slope is the main limitation of this soil for nonfarm development.

The capability subclass is VIIe.

CvF—Cuchillas-Rock outcrop complex, 40 to 60 percent slopes. This complex is on the side slopes and ridgetops of the humid volcanic uplands. It consists of areas of very steep, well drained soils and areas of exposed bedrock. Slopes are 100 to 500 feet long. The areas of the complex are 50 to 300 acres. They are about 75 percent moderately deep Cuchillas soils, 15 percent exposed bedrock, and 10 percent other soils. The Cuchillas soils and exposed rock are so intermingled that it was not practical to map them separately.

Typically, the Cuchillas soils have a surface layer of brown, firm silty clay loam about 6 inches thick. The subsoil is yellowish brown, firm silty clay loam 10 inches thick. The substratum is yellowish brown, firm clay loam 12 inches thick. Semiconsolidated volcanic rock is at a depth of 28 inches.

Included with this complex in mapping are areas of Maricao soils.

The Cuchillas soils in this complex have moderate permeability. The available water capacity is high. Runoff is very rapid. Natural fertility is high. Reaction in the surface layer and subsoil is strongly acid.

Slope makes this complex poorly suited for farming. The complex is mainly in brush, shrubs, and low quality native grass. Some small areas are in coffee.

This complex is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Controlling brush and fertilizing help to improve the survival rate of seedlings.

Slope and the areas of exposed rock limit this complex for most types of nonfarm development.

The capability subclass is VIIs.

DaD2—Daguey clay, 12 to 20 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on the ridgetops and side slopes of the humid volcanic uplands. Slopes are 200 to 1,000 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is dark brown, firm clay about 8 inches thick. The subsoil is multicolored, firm clay 48 inches thick. The substratum is multicolored, very friable silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Humatas soils and soils that have slopes of 20 to 40 percent. Included areas make up 10 to 15 percent of the unit.

The permeability of this Daguey soil is moderate, and the available water capacity is high. Runoff is rapid, and natural fertility is medium. Reaction in the surface layer and subsoil is very strongly acid.

This soil is well suited for cultivated crops such as coffee, plantains, yams, and taniers. Slope is the main limitation for farming. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and merkergrass. Using proper stocking rates and deferred grazing and liming and fertilizing are the main pasture management concerns.

The soil is well suited for Honduras pine, Honduras mahogany, robusta eucalyptus, kadam, and mahoe. Slope limits the use of equipment, and the soil is slippery when wet. Controlling weeds and brush, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and the clayey texture limit this soil for nonfarm development.

The capability subclass is IIIe.

EaB—Espinosa sandy loam, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes are 400 to 800 feet long. The areas of the soil range from 20 to 60 acres.

Typically, the surface layer is dark brown, friable sandy loam about 10 inches thick. The subsoil is firm and multicolored and extends to a depth of 60 inches or more. It is sandy clay to a depth of 16 inches and clay at a depth of more than 16 inches.

Included with this soil in mapping are small areas of Almirante soils and small areas of exposed bedrock. Included areas make up 10 to 15 percent of the unit.

The permeability of this Espinosa soil is rapid in the surface layer and moderate in the subsoil. The available water capacity is low to moderate, and runoff is slow. This soil is medium to low in natural fertility. Reaction of the surface layer and subsoil is very strongly acid.

This soil is well suited for sugarcane, sweet potatoes, and pineapples. The strong acidity, low available water capacity, and low to moderate fertility are the main limitations. Crops on this soil respond well to lime and fertilizer, and irrigation is needed in some areas.

The soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil has few limitations for most types of nonfarm development.

The capability subclass is IIIs.

EaC—Espinosa sandy loam, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes are 400 to 800 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is dark brown, friable sandy loam about 10 inches thick. The subsoil is multicolored and firm and extends to a depth of 60 inches or more. It is sandy clay to a depth of 16 inches and clay at a depth of more than 16 inches.

Included with this soil in mapping are small areas of Almirante soils and small areas of exposed bedrock. Included areas make up 10 to 15 percent of the unit.

The permeability of this Espinosa soil is rapid in the surface layer and moderate in the subsoil. The available water capacity is low to moderate. Runoff is medium. Natural fertility is medium. Reaction throughout is very strongly acid.

This soil is well suited for sugarcane, sweet potatoes, and pineapples. An erosion hazard, strong acidity, and low available water capacity are the main limitations. Crops on this soil respond well to applications of lime and fertilizer, and irrigation is needed in some areas.

The soil is well suited for pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

Slope is the main limitation of the soil for nonfarm development.

The capability subclass is IVe.

EbB—Espinosa sandy clay loam, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes are 400 to 800 feet long. The areas of the soil range from 20 to 60 acres in size.

Typically, the surface layer is dark brown, friable sandy clay loam about 10 inches thick. The subsoil is firm and multicolored and extends to a depth of 60 inches or more. It is sandy clay to a depth of 16 inches and clay at a depth of more than 16 inches.

Included with this soil in mapping are small areas of Almirante soils and small areas of exposed bedrock. Included areas make up 10 to 15 percent of the unit.

The permeability and available water capacity of this Espinosa soil are moderate. Runoff and natural fertility are medium. Reaction throughout is very strongly acid.

This soil is well suited for sugarcane, sweet potatoes, pineapples, and plantains and is used for vegetables and citrus fruits. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for pangolagrass, stargrass, and merkergrass. Irrigation is needed in some areas. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil has few limitations for most types of nonfarm development.

The capability subclass is IIe.

EbC—Espinosa sandy clay loam, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes are 400 to 800 feet long. The areas of the soil range from 20 to 60 acres.

Typically, the surface layer is dark brown, friable sandy clay loam about 10 inches thick. The subsoil is firm and multicolored and extends to a depth of 60 inches or more. It is sandy clay to a depth of 16 inches and clay at a depth of more than 16 inches.

Included with this soil in mapping are small areas of Almirante soils and small areas of exposed bedrock. Included areas make up 10 to 15 percent of the unit.

The permeability and available water capacity of this Espinosa soil are moderate. Runoff and natural fertility are medium. Reaction throughout is very strongly acid.

This soil is well suited for sugarcane, sweet potatoes, pineapples, and plantains and is used for vegetables and citrus fruits. Crops on this soil respond well to applications of lime and fertilizer, and irrigation is needed in some places.

This soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

Slope is the main limitation of the soil for nonfarm development.

The capability subclass is IIIe.

EcB—Espinosa clay, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes are 400 to 1,000 feet long. The areas of the soil range from 20 to 200 acres.

Typically, the surface layer is dark brown, friable clay about 10 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Almirante soils and small areas of exposed bedrock. Included areas make up 10 to 15 percent of the unit.

The permeability of this Espinosa soil is moderate, and the available water capacity is high. Runoff and fertility are medium. Reaction throughout is very strongly acid.

This soil is well suited for sugarcane, pineapples, sweet potatoes, and plantains. Some areas are used for vegetables and citrus fruits. Crops on this soil respond well to applications of lime and fertilizer.

This soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Using proper stocking rates and deferred grazing, fertilizing and liming, and controlling weeds and brush are the main pasture management concerns.

The clayey texture is the main limitation of the soil for nonfarm development.

The capability subclass is IIe.

EcC—Espinosa clay, 5 to 12 percent slopes. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes are 200 to 500 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is dark brown, friable clay about 10 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Almirante soils and small areas of exposed bedrock. Included areas make up 10 to 15 percent of the unit.

The permeability of this Espinosa soil is moderate, and the available water capacity is high. Runoff and fertility are medium. Reaction throughout is very strongly acid.

This soil is well suited for sugarcane, pineapples, sweet potatoes, and plantains and is used for vegetables and citrus fruits. An erosion hazard, strong acidity, and slope are the main limitations. Crops on this soil respond well to applications of lime and fertilizer, but the clayey texture hinders tillage when the soil is wet.

The soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Using proper stocking rates and deferred grazing, fertilizing and liming, and controlling weeds are the main pasture management concerns.

Slope and the clayey texture are the main limitations of the soil for nonfarm development.

The capability subclass is IIIe.

Ga—Garrochales muck. This soil is deep, nearly level, and poorly drained. It is on bottom lands and in depressional areas on the humid coastal lowlands. The areas range from 10 to 60 acres.

Typically, the soil is black and brown, friable organic material to a depth of about 46 inches. The underlying layer is 10 inches of blue and gray silt loam underlain by grayish brown organic material that extends to a depth of more than 60 inches.

Included with this soil in mapping are small areas of Tiburones and Palmar soils and soils that have a surface layer of silt loam. Included soils make up 5 to 15 percent of the unit.

The permeability of this Garrochales soil is slow, and the available water capacity is high. Runoff is slow.

A high water table, a hazard of flooding, and poor drainage make this soil generally unsuitable for most uses other than pasture. Most areas of the soil are in water-tolerant plants such as cattails, sedges, and papyrus. The soil is suitable for paragrass. Using proper stocking rates and deferred grazing and fertilizing are the main pasture management concerns.

The capability subclass is VIIw.

GeC—Guerrero sand, 2 to 12 percent slopes. This soil is deep, gently sloping to sloping, and excessively drained. It is on undulating hills on the coastal plains and between limestone hills. Slopes are 100 to 800 feet long. The areas of the soil range from 20 to 200 acres.

Typically, the surface layer is dark grayish brown, friable sand about 10 inches thick. The subsurface layer is dark yellowish brown, friable sand 14 inches thick. The subsoil is multicolored and firm and extends to a depth of 60 inches or more. It is sandy clay in the upper part and clay in the lower part.

Included with this soil in mapping are small areas of Jobos and Carrizales soils that make up 10 to 15 percent of the unit.

The permeability of this Guerrero soil is rapid in the surface and subsurface layers and moderate in the subsoil. The available water capacity is moderate. Runoff is slow to medium, and natural fertility is low. Reaction is medium acid to slightly acid in the surface and subsurface layers and very strongly acid in the subsoil.

The available water capacity and low fertility level make this soil poorly suited for cultivated crops. The soil is mainly used for coconuts. Some small areas are used for cassavas and sweet potatoes.

The soil is well suited for such pasture plants as pangolagrass. Sprinkler irrigation is needed in some areas. Using proper stocking rates and deferred grazing, fertilizing and liming, and controlling brush are the main pasture management concerns.

This soil has few limitations for nonfarm development, but seepage is a hazard in some areas.

The capability subclass is VIs.

HD—Hydraquents, frequently flooded. This unit consists of deep, nearly level, poorly drained soils on flood plains. Slopes range from 0 to 2 percent, and the areas of the soil range from 50 to 300 acres.

Generally, the surface layer ranges from loam to clay loam. The substratum is clay.

Included with this unit in mapping are small areas of Coloso, Bajura, Vega Alta, and Jobos soils that make up 10 to 20 percent of the unit.

The permeability of these Hydraquents is slow. The available water capacity is high. Runoff is very slow. These soils have a high level of natural fertility. The water table is at or near the surface throughout the year. Reaction throughout the soils is slightly acid to mildly alkaline.

Flooding, poor drainage, and excessive wetness make these soils unsuitable for most uses other than wetland wildlife habitat.

The capability subclass is VIIIw.

HmE—Humatas clay, 20 to 40 percent slopes. This soil is deep, steep, and well drained. It is on the side slopes and ridgetops of humid volcanic uplands. Slopes

are 100 to 500 feet long. The areas of the soil range from 20 to 200 acres.

Typically, the surface layer is reddish brown, friable clay about 5 inches thick. The subsoil is yellowish red, firm clay 25 inches thick. The substratum is variegated, very friable saprolite to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Daguey and Consumo soils that make up 5 to 15 percent of the unit.

The permeability and available water capacity of this Humatas soil are moderate. Runoff is rapid, and fertility is medium. Reaction throughout the soil is very strongly acid.

This soil is suitable for such crops as shade-grown coffee, tobacco, taniers, yams, bananas, oranges, and plantains, but controlling erosion is a major management concern. Slope and the clayey texture hinder tillage. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Planting on the contour helps to control erosion, and controlling brush and weeds and fertilizing help to improve the survival rate of seedlings.

Slope and the clayey texture limit the soil for nonfarm development. Slippage of the soil is common in roadbanks, ditches, and drainageways.

The capability subclass is IVe.

HmF—Humatas clay, 40 to 60 percent slopes. This soil is deep, very steep, and well drained. It is on the side slopes and ridgetops of humid volcanic uplands. Slopes are 200 to 1,200 feet long. The areas of the soil range from 20 to 400 acres.

Typically, the surface layer is reddish brown, friable clay about 5 inches thick. The subsoil is yellowish red, firm clay 25 inches thick. The substratum is variegated, very friable saprolite to a depth of 60 inches on more.

Included with this soil in mapping are small areas of Consumo soils that make up 10 to 15 percent of the unit.

The permeability and available water capacity of this Humatas soil are moderate. Runoff is very rapid, and fertility is medium. Reaction is very strongly acid throughout the soil.

Slope and an erosion hazard make this soil poorly suited for cultivated crops. The soil is mainly used for shade-grown coffee, bananas, and oranges, and some small areas are used for yams, taniers, and plantains. Crops on this soil respond well to applications of lime and fertilizer, but slope and the clayey texture restrict tillage.

The soil is well suited for pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Planting on the contour helps to reduce erosion. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and the clayey texture limit the soil for most types of nonfarm development. Slippage of the soil is common in roadbanks, ditches, and drainageways.

The capability subclass is VIe.

HS—Hydraquents, saline. This unit consists of deep, poorly drained, nearly level soils that are flooded most of the year. The unit is in lagoons in depressional areas near coastal inlets. Slopes range from 0 to 2 percent, and the areas of the soil range from 50 to 400 acres.

Generally, the surface layer ranges from sand to clay. The substratum ranges from sandy clay to clay.

Included with this unit in mapping are small areas of Catano, Carrizales, Jobos, and Bajura soils that make up 5 to 15 percent of the unit.

The permeability of these Hydraquents is slow, and the available water capacity is high. Runoff is very slow. The water table is at or near the surface throughout the year. Reaction is slightly acid to strongly alkaline throughout.

Flooding, poor drainage, and wetness make these soils unsuitable for most uses other than wetland wildlife habitat.

The capability subclass is VIIIw.

InD—Ingenio clay loam, 5 to 20 percent slopes. This soil is deep, sloping to moderately steep, and well drained. It is on the ridgetops and side slopes of humid uplands. Slopes are 200 to 800 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is dark brown, firm clay loam about 6 inches thick. The subsoil is multicolored clay 32 inches thick and is firm in the lower part. The substratum is multicolored saprolite that extends to a depth of 60 inches or more.

Included with this soil in mapping are areas of Lirios soils that make up 5 to 10 percent of the unit.

The permeability and available water capacity of this Ingenio soil are moderate. Runoff is rapid, and fertility is medium. Reaction is medium acid in the surface layer and neutral in the lower layers.

This soil is well suited for coffee, plantains, yams, taniers, and sweet potatoes. Some areas are in citrus fruits and bananas. An erosion hazard is the main management concern. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. Applying lime

and fertilizer, using proper stocking rates and deferred grazing, and controlling weeds are the chief pasture management concerns.

This soil is well suited for Honduras pine (fig. 2) and robusta eucalyptus, but slope limits the use of equipment. Controlling brush and fertilizing help to improve the survival rate of seedlings.

Figure 2.—Honduras pine on Ingenio clay loam, 5 to 20 percent slopes.

Slope limits the soil for most types of nonfarm development.

The capability subclass is IIIe.

InE—Ingenio clay loam, 20 to 40 percent slopes. This soil is deep, steep, and well drained. It is on the side slopes of humid uplands. Slopes are 100 to 300 feet long. The areas of the soil range from 10 to 50 acres.

Typically, the surface layer is dark brown, firm clay loam about 6 inches thick. The subsoil is multicolored clay 32 inches thick and is firm in the lower part. The substratum is multicolored saprolite that extends to a depth of 60 inches or more.

Included with this soil in mapping are areas of Lirios soils and small areas of severely eroded soils. Included soils make up 5 to 10 percent of the map unit.

The permeability and available water capacity of this Ingenio soil are moderate. Runoff is rapid. Natural fertility is medium. Reaction throughout the soil is very strongly acid.

Slope and an erosion hazard make this soil poorly suited for cultivated crops. The soil is used mostly for coffee, taniers, yams, plantains, and sweet potatoes. Some small areas are used for citrus fruits and bananas. Slips are common in ditches and drainageways in this soil. Crops on this soil respond well to applications of lime and fertilizer.

This soil is well suited for pangolagrass and stargrass. Applying lime and fertilizer, using proper stocking rates and deferred grazing, and controlling weeds are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Fertilizing, hand planting on the contour, and controlling weeds help to improve the survival rate of seedlings.

Slope is the main limitation of this soil for most types of nonfarm development.

The capability subclass is IVe.

IsC—Islote sandy clay loam, 2 to 12 percent slopes. This soil is moderately deep, gently sloping to sloping, and well drained. It is on low hills and small terraces. Slopes are 100 to 400 feet long. The areas of the soil range from 10 to 60 acres.

Typically, the surface layer is dark brown, friable sandy clay loam about 8 inches thick. The subsoil is brown and red, firm clay 22 inches thick. Partially cemented calcareous sandstone is at a depth of 30 inches.

Included with this soil in mapping are small areas of Islote soils that have a surface layer of sandy loam and clay and small areas of severely eroded soils. Included soils make up 5 to 15 percent of the unit.

The permeability of this Islote soil is moderately rapid in the surface layer and moderate in the subsoil. The available water capacity is moderate. Runoff is slow to medium. Natural fertility is medium. Reaction is medium acid in the surface layer and slightly acid to neutral in the subsoil. The subsoil has a moderate shrink-swell potential.

This soil is used mainly for sugarcane. Some small areas are in sweet potatoes and pigeon peas. The clayey texture of the subsoil hinders cultivation. Crops on this soil respond well to applications of fertilizer.

This soil is well suited for such pasture plants as pangolagrass, paragrass, and merkergrass. Some spots are in native pasture and brush. Using proper stocking rates, fertilizing, and deferred grazing are the main pasture management concerns.

The capability subclass is IIIe.

Ja—Jareales clay. This soil is deep, nearly level, and poorly drained. It is on the coastal lowlands. The areas range from 20 to 100 acres.

Typically, the surface layer is 6 inches of very dark gray, firm clay. The subsoil is black and gray, mottled

clay 22 inches thick. The substratum is black organic material to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Bajura soils, Vigia soils, and calcareous soils. Included soils make up 10 to 15 percent of the unit.

The permeability of this Jareales soil is very slow in the surface layer and subsoil and slow in the substratum. The available water capacity is high. Runoff is slow. The natural fertility and organic matter content of the soil are high. Reaction is neutral in the surface layer and subsoil and slightly acid in the substratum. The surface layer and subsoil have a high shrink-swell potential.

Drained areas of this soil are well suited for cultivated crops, and most of the drained areas are used for sugarcane. Undrained areas are suitable for rice.

This soil is well suited for stargrass, pangolagrass, and paragrass. Using proper stocking rates and deferred grazing, controlling weeds, fertilizing, and preventing grazing when the soil is too wet are the main pasture management concerns.

Wetness is the main limitation of the soil for nonfarm development.

The capability subclass is IVw.

JoC—Jobos sandy loam, 2 to 12 percent slopes. This soil is deep, gently sloping to sloping, and moderately well drained. It is in small valleys and on undulating hills on the coastal plains and between limestone hills. Slopes are 100 to 800 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is dark brown, friable sandy loam about 8 inches thick. The subsoil is multicolored clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Guerrero soils and small areas of Jobos soils that have a surface layer of clay. Included soils make up 10 to 15 percent of the unit.

The permeability of this Jobos soil is rapid in the surface layer and slow in the subsoil. The available water capacity is moderate. Runoff is slow to medium. Natural fertility is low. Reaction throughout is very strongly acid. The subsoil has a moderate shrink-swell potential.

This soil is occasionally used for cultivated crops such as sweet potatoes and cassavas. Some areas are in sugarcane and coconuts. Crops on this soil respond well to applications of fertilizer, but droughtiness makes sprinkler irrigation necessary in some areas.

This soil is well suited for pangolagrass and stargrass. Some small areas are in native pasture and brush. The low fertility and the available water capacity are the major limitations. Using proper stocking rates and deferred grazing, fertilizing and liming, and controlling weeds are the main pasture management concerns.

The capability subclass is VIs.

JuD2—Juncal clay, 12 to 20 percent slopes, eroded. This soil is deep, moderately steep, and moderately well drained. It is on low, rolling hills and foot slopes in the humid limestone area. Slopes are 100 to 500 feet long. The areas of the soil range from 10 to 100 acres.

Typically, the surface layer is dark brown, firm clay about 8 inches thick. The subsoil is mottled, yellowish brown clay 32 inches thick. The substratum is yellowish brown, mottled silty clay loam to a depth of 60 inches.

Included with this soil in mapping are small areas of Naranjo soils, small areas of slightly eroded Juncal soils, and small areas of soils with a surface layer of clay loam. Included soils make up 10 to 15 percent of the unit.

The permeability of this Juncal soil is moderate, and the available water capacity is high. Runoff and natural fertility are medium. Reaction is medium acid in the surface layer and subsoil and moderately alkaline in the substratum. The soil has moderate shrink-swell potential.

This soil is well suited for such cultivated crops as taniers, yams, pigeon peas, and plantains, but the slope and clayey texture hinder cultivation. Crops on this soil respond well to fertilizers.

The soil is well suited for such pasture plants as pangolagrass, improved bermudagrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the chief pasture management concerns.

This soil is well suited for Honduras pine and Honduras mahogany, but slope limits the use of equipment. Equipment is further restricted because the soil is sticky and slippery when wet. Controlling brush and weeds and fertilizing help to improve the survival rate of the seedlings.

Slope, low strength, and the moderate shrink-swell potential are the main limitations of the soil for nonfarm development.

The capability subclass is IIIe.

JuE2—Juncal clay, 20 to 40 percent slopes, eroded. This soil is deep, steep, and moderately well drained. It is on side slopes and ridgetops in the humid limestone areas. Slopes are 100 to 200 feet long. The areas of the soil range from 10 to 50 acres.

Typically, the surface layer is dark brown, firm clay about 8 inches thick. The subsoil is mottled, yellowish brown clay 32 inches thick. The substratum is mottled, yellowish brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Naranjo soils and slightly eroded soils. Also included are areas of Juncal soils that have slopes of 40 to 60 percent and spots of Colinas soils. Included soils make up 5 to 10 percent of the map unit.

The permeability of this Juncal soil is moderate, and the available water capacity is high. Runoff is rapid, and natural fertility is medium. Reaction is medium acid in the surface layer and subsoil and moderately alkaline in the

substratum. The soil has a moderate shrink-swell potential.

This soil is well suited for such cultivated crops as taniers, yams, pigeon peas, and plantains. Slope and the clayey texture of the soil are the main limitations. Crops on this soil respond well to applications of fertilizer.

The soil is well suited for such pasture plants as pangolagrass, improved bermudagrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the chief pasture management concerns.

This soil is well suited for Honduras pine and Honduras mahogany, but slope limits the use of equipment. Equipment use is further restricted because the soil is sticky and slippery when wet. Controlling brush and weeds and fertilizing help to improve the survival rate of seedlings.

Slope, low strength, and the moderate shrink-swell potential are the main limitations of the soil for nonfarm development.

The capability subclass is IVe.

LcE2—Lirios clay loam, 20 to 40 percent slopes, eroded. This soil is deep, steep, and well drained. It is on the side slopes and narrow ridgetops of uplands. Slopes are 100 to 500 feet long. The areas of the soil range from 10 to 60 acres.

Typically, the surface layer is strong brown, friable clay loam about 6 inches thick. The subsoil is red and reddish yellow, firm clay 18 inches thick. The substratum is multicolored saprolite to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Ingenio and Humatas soils and small areas of severely eroded soils. Included soils make up 5 to 15 percent of the unit.

The permeability of this Lirios soil is moderate, and the available water capacity is high. Runoff is rapid. Natural fertility is medium. Reaction is strongly acid in the surface layer and very strongly acid in the lower layers.

This soil is well suited for plantains, yams, taniers, tobacco, bananas, coffee, and sweet potatoes. Slope is a limitation, however, and slippage is common in roadbanks, ditches, and drainageways. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and merkergrass. Using proper stocking rates and deferred grazing and controlling weeds are the chief pasture management concerns.

This soil is well suited for Honduras pine, Honduras mahogany, and robusta eucalyptus. Slope limits the use of equipment, and the soil is slippery when wet. Controlling brush and weeds, fertilizing, and hand planting help to improve the survival rate of seedlings.

Slope and low strength are the main limitations of the soil for most types of nonfarm development.

The capability subclass is IVe.

LcF2—Lirios clay loam, 40 to 60 percent slopes, eroded. This soil is deep, very steep, and well drained. It is on the side slopes and narrow ridgetops of uplands. Slopes are 100 to 300 feet long. The areas of the soil range from 50 to 200 acres.

Typically, the surface layer is strong brown, friable clay loam about 6 inches thick. The subsoil is red and reddish yellow, firm clay 18 inches thick. The substratum is multicolored saprolite that extends to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Humatas and Pellejas soils and small areas of severely eroded soils. Included soils make up 5 to 15 percent of the unit.

The permeability of this Lirios soil is moderate, and the available water capacity is high. Runoff is very rapid. Natural fertility is medium. Reaction is strongly acid in the surface layer and very strongly acid in the lower layers.

Slope and an erosion hazard make this soil poorly suited for cultivated crops, but some areas are used for shade-grown coffee, bananas, oranges, yams, taniers, and tobacco. Crops respond well to the application of lime and fertilizers, but such application is limited by slope.

The soil is well suited for such pasture plants as pangolagrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the chief pasture management concerns.

This soil is well suited for Honduras pine, Honduras mahogany, and robusta eucalyptus, but slope limits the use of equipment. The soil is slippery when wet. Controlling brush and weeds, fertilizing, and hand planting help to improve the survival rate of seedlings.

Slope is the main limitation of this soil for nonfarm development.

The capability subclass is VIe.

LgD—Los Guineos clay, 12 to 20 percent slopes. This soil is deep, moderately steep, and moderately well drained. It is on the ridgetops and side slopes of humid volcanic uplands. Slopes are 100 to 800 feet long. The areas of the soil range from 20 to 60 acres.

Typically, the surface layer is dark brown, friable clay about 6 inches thick. The subsoil is brown and red, mottled, firm clay 40 inches thick. The substratum is variegated clay saprolite to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Humatas soils that make up 5 to 10 percent of the unit.

The permeability and available water capacity of this Los Guineos soil are moderate. Runoff is rapid. Natural fertility is medium. Reaction throughout the soil is very strongly acid.

This soil is well suited for coffee, taniers, bananas, and plantains. Slope is the main management concern.

Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and merkergrass. Using proper stocking rates and deferred grazing and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine, mahoe, and robusta eucalyptus, but slope limits the use of equipment. The soil is slippery when wet. Controlling weeds and brush, fertilizing, and hand planting help to improve the survival rate of seedlings.

Slope and the clayey texture are the main limitations of the soil for nonfarm development.

The capability subclass is IVe.

LgE—Los Guineos clay, 20 to 40 percent slopes. This soil is deep, steep, and moderately well drained. It is on the side slopes and ridgetops of humid volcanic uplands. Slopes are 100 to 800 feet long. The areas of the soil range from 50 to 200 acres.

Typically, the surface layer is dark brown, friable clay about 6 inches thick. The subsoil is brown and red, mottled, firm clay 40 inches thick. The substratum is variegated clay saprolite to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Humatas soils and spots of severely eroded soils. Included soils make up 5 to 15 percent of the unit.

The permeability and available water capacity of this Los Guineos soils are moderate. Runoff is rapid. The natural fertility is medium. Reaction throughout the soil is very strongly acid.

This soil is well suited for shade-grown coffee. Some areas are used for taniers, bananas, oranges, and plantains, but slope limits the use of equipment and the soil is sticky and slippery when wet. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope restricts the use of equipment. The soil is slippery and subject to slippage when wet. Controlling weeds and brush, fertilizing, and hand planting help to improve the survival rate of seedlings.

Slope, the clayey texture, and low strength limit this soil for most types of nonfarm development.

The capability subclass is VIe.

LgF—Los Guineos clay, 40 to 60 percent slopes. This soil is deep, very steep, and moderately well drained. It is on the side slopes and ridgetops of humid volcanic uplands. Slopes are 100 to 600 feet long. The areas of the soil range from 50 to 300 acres.

Typically, the surface layer is dark brown, friable clay about 6 inches thick. The subsoil is brown and red, mottled, firm clay 40 inches thick. The substratum is variegated clay saprolite to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Humatas and Consumo soils that make up 10 to 15 percent of the unit.

The permeability and available water capacity of this Los Guineos soil are moderate. Runoff is very rapid. Natural fertility is medium. Reaction throughout the soil is very strongly acid.

This soil is well suited for shade-grown coffee. Some small areas are used for bananas, oranges, and taniers, but slope restricts the use of equipment and the soil is slippery and sticky when wet. Crops on this soil respond well to applications of lime and fertilizers, but slope limits such applications.

The soil is well suited for pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. The soil is slippery when wet and is subject to slippage. Controlling brush and weeds, fertilizing, and hand planting help to reduce the rate of seedling mortality.

Slope, the clayey texture, and low strength limit this soil for most types of nonfarm development.

The capability subclass is VIIe.

LME—Los Guineos-Maricao-Rock outcrop association, steep. This unit consists of deep, steep and very steep soils and areas of exposed volcanic rock. The unit is on the side slopes and ridgetops of humid volcanic uplands. Slopes are 100 to 400 feet long. The areas of this unit range from 100 to 800 acres. The acreage is about 50 percent moderately well drained Los Guineos soils, 30 percent well drained Maricao soils, 15 percent exposed rock, and 5 percent other soils. The soils and exposed rock are mapped together because there are no major differences in their use.

Typically, the surface layer of the Los Guineos soils is dark brown, friable clay about 6 inches thick. The subsoil is red and brown, mottled, firm clay 40 inches thick. The substratum is variegated clay saprolite to a depth of 60 inches or more.

Typically, the surface layer of the Maricao soils is yellowish red, friable clay about 6 inches thick. The subsoil is yellowish red and red, mottled clay 14 inches thick. The substratum is variegated clay saprolite to a depth of 60 inches or more.

Included with this unit in mapping are small areas of Cuchillas soils.

The Los Guineos and Maricao soils in this unit have moderate permeability and moderate available water capacity. Runoff is very rapid. Natural fertility is medium. The reaction of both soils is strongly acid and very

strongly acid in the surface layer and very strongly acid in the subsoil and substratum.

Slope and the exposed rock make this unit poorly suited for cultivated crops. Most areas are in brushy pasture and forest, and some small areas are in coffee.

The unit is well suited for pangolagrass and stargrass. Using proper stocking rates and deferred grazing and liming and fertilizing are the main pasture management concerns.

This unit is well suited for Honduras pine and robusta eucalyptus, but slope and the exposed rock limit the use of equipment, and the soil is slippery when wet.

Slope and the rocky surface limit this unit for most types of nonfarm development.

The capability subclass is VIIe.

MaF2—Maraguez silty clay loam, 40 to 60 percent slopes, eroded. This soil is deep, very steep, and well drained. It is on the side slopes and ridgetops of humid volcanic uplands. Slopes are 200 to 800 feet long. The areas of the soil range from 50 to 200 acres.

Typically, the surface layer is dark brown silty clay loam about 7 inches thick. The subsoil is yellowish brown and is 14 inches thick. The upper part of the subsoil is silty clay loam, and the lower part is clay loam. The substratum is mainly yellowish brown and brownish yellow loam to a depth of 60 inches or more.

Included with this soil in mapping are areas of Mucara soils and areas of Maraguez soils that have slopes of 20 to 40 percent. Included soils make up 5 to 15 percent of the unit.

The permeability of this Maraguez soil is moderate in the surface layer and subsoil and moderately rapid in the substratum. The available water capacity is low. Runoff is very rapid. Natural fertility is medium. Reaction is medium acid in the surface layer and slightly acid in the lower layers.

Slope and an erosion hazard make this soil poorly suited for cultivated crops. Most areas are used for shade-grown coffee, bananas, and oranges. Crops on this soil respond well to fertilizer applications.

The soil is well suited for pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Controlling brush and weeds, fertilizing, and hand planting help to reduce the rate of seedling mortality.

Slope limits this soil for most types of nonfarm development.

The capability subclass is VIIe.

McF—Maricao clay, 40 to 60 percent slopes. This soil is deep, very steep, and well drained. It is on the ridgetops and side slopes of humid uplands. Slopes are 200 to 600 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is yellowish red clay about 6 inches thick. The subsoil is yellowish red and red, mottled clay 14 inches thick. The substratum is variegated clay saprolite to a depth of 60 inches or more.

Included with this soil in mapping are areas of Humatas and Cuchillas soils that make up 5 to 10 percent of the unit.

The permeability and available water capacity of this Maricao soil are moderate. Runoff is very rapid. Natural fertility is medium. Reaction is very strongly acid throughout the soil.

Slope and an erosion hazard make this soil poorly suited for cultivated crops. Most areas are in native pasture and brush, and some small areas are in shade-grown coffee, bananas, oranges, taniers, and yams. Slope and the clayey texture of the soil especially limit tillage. Crops on this soil respond well to the application of lime and fertilizers, but such application is also limited by slope.

The soil is well suited for pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Controlling brush and weeds, fertilizing, and hand planting help to improve the survival rate of seedlings.

Slope is the major limitation of this soil for nonfarm development and makes the soil susceptible to landslides.

The capability subclass is VIIe.

MmF—Matanzas-Rock outcrop complex, 5 to 60 percent slopes. This unit consists of deep, sloping to very steep, well drained soils and areas of limestone rock. The unit is in small valleys and on coastal plains. Slopes range from 200 to 600 feet long. The areas of the unit range from 20 to 100 acres and consist of about 65 percent Matanzas soils, 30 percent rock, and 5 percent other soils. The Matanzas soils and exposed rock are so intermingled that it was not practical to map them separately.

Typically, the surface layer of the Matanzas soils is dark reddish brown clay about 8 inches thick. The subsoil is red clay 34 inches thick. Limestone bedrock is at a depth of 42 inches.

Included with this complex in mapping are areas of Bayamon soils.

The Matanzas soils in this unit have moderate permeability and high available water capacity. Runoff is slow. Natural fertility is medium. Reaction throughout the soil is neutral.

The rocky surface hinders tillage and makes this complex poorly suited for cultivated crops. Some small

areas are used for plantains, yams, and taniers, but most of the cultivation is done by hand. Crops on this complex respond well to applications of fertilizer.

The complex is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. Using proper stocking rates, deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The rocky surface is the main limitation of the complex for nonfarm development.

The capability subclass is VIs.

MnB—Matanzas clay, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in valleys between limestone hills and on the coastal plains. Slopes are 200 to 1,000 feet long. The areas range from 20 to 100 acres.

Typically, the surface layer is dark reddish brown clay about 8 inches thick. The subsoil is red clay 34 inches thick. Limestone bedrock is at a depth of 42 inches.

Included with this soil in mapping are areas of Bayamon soils and small areas of exposed limestone bedrock. Included areas make up 5 to 10 percent of the unit.

The permeability of this Matanzas soil is moderate, and the available water capacity is high. Runoff is slow. Natural fertility is medium. Reaction throughout the soil is neutral.

This soil is well suited for cultivation. It is used mostly for plantains, yams, and taniers. Some small areas are in citrus fruits, West Indian cherries, and avocados. Crops on this soil respond well to applications of fertilizer.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The depth to rock and clayey texture are the main limitations of this soil for nonfarm development.

The capability subclass is IIe.

MoC2—Moca clay, 2 to 12 percent slopes, eroded. This soil is deep, gently sloping to sloping, and moderately well drained. It is on foot slopes and low, rolling hills in humid volcanic areas. Slopes are 200 to 800 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is dark reddish brown, firm clay about 6 inches thick. The subsoil is multicolored, mottled clay 24 inches thick. The substratum is multicolored, mottled clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Perchas and Vega Alta soils that make up 10 to 15 percent of the unit.

The permeability of this Moca soil is moderately slow, and the available water capacity is high. Runoff is medium. Natural fertility is medium. Reaction throughout the soil is very strongly acid. The subsoil has a high shrink-swell potential.

This soil is well suited for plantains and taniers. Some small areas are in sugarcane, coffee, and bananas. Cultivation of the soil is hindered by the clayey texture. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and merkergrass. An erosion hazard and strong acidity are the main limitations. Using proper stocking rates and deferred grazing, fertilizing and liming, and controlling weeds are the main pasture management concerns.

This soil is well suited for Honduras pine, kadam, and mahoe. The use of equipment is limited because the soil is sticky and slippery when wet. Controlling weeds and brush, hand planting, and fertilizing help to improve the survival rate of seedlings.

The high shrink-swell potential and low strength of the soil are the main limitations for nonfarm development.

The capability subclass is IIIe.

MoD2—Moca clay, 12 to 20 percent slopes, eroded. This soil is deep, moderately steep, and moderately well drained. It is on low, rolling hills in the humid volcanic areas. Slopes are 200 to 600 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is dark reddish brown, firm clay about 6 inches thick. The subsoil is multicolored, mottled clay 24 inches thick. The substratum is multicolored, mottled clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Vega Alta soils that make up 5 to 10 percent of the unit.

The permeability of this Moca soil is moderately slow, and the available water capacity is high. Runoff is rapid. Natural fertility is medium. Reaction throughout the soil is very strongly acid. The subsoil has a high shrink-swell potential.

This soil is mainly used for plantains and taniers. Some areas are in sugarcane, coffee, and bananas. Slope is the main limitation for farming, and the clayey texture of the soil further limits cultivation. Crops on this soil respond well to applications of lime and fertilizer.

This soil is well suited for such pasture plants as pangolagrass and merkergrass. Using proper stocking rates, and deferred grazing, liming and fertilizing, controlling weeds, and controlling grazing during wet periods are the main pasture management concerns.

This soil is well suited for Honduras pine, kadam, and mahoe. Slope limits the use of equipment, and the soil is sticky and slippery when wet. Controlling weeds and brush, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and the high shrink-swell potential are the main limitations of the soil for nonfarm development.

The capability subclass is IVe.

MoE2—Moca clay, 20 to 40 percent slopes, eroded. This soil is deep, steep, and moderately well drained. It is on the side slopes and hilltops of the humid volcanic areas. Slopes are 100 to 400 feet long. The areas of the soil range from 20 to 60 acres.

Typically, the surface layer is dark reddish brown, firm clay about 6 inches thick. The subsoil is multicolored, mottled clay 24 inches thick. The substratum is multicolored mottled clay to a depth of 60 inches or more.

Included with this soil in mapping are some small areas of soils that have slopes of 12 to 20 percent and a few areas of severely eroded soils. Included soils make up 5 to 15 percent of the unit.

The permeability of this Moca soil is moderately slow, and the available water capacity is high. Runoff is rapid. Natural fertility is medium. Reaction throughout the soil is very strongly acid. The subsoil has a high shrink-swell potential.

Slope makes this soil poorly suited for cultivated crops, but some areas are used for plantains, sugarcane, and coffee. Slope hinders the use of equipment, and the soil is sticky and slippery when wet. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and merkergrass. Using proper stocking rates and deferred grazing, liming and fertilizing, controlling weeds, and controlling grazing during wet periods are the main pasture management concerns.

This soil is well suited for Honduras pine, kadam, and mahoe, but slope limits the use of equipment, and the soil is sticky and slippery when wet. Controlling weeds and brush, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope, low strength, and the high shrink-swell potential are the main limitations of the soil for nonfarm development.

The capability subclass is VIe.

MpF2—Morado clay loam, 40 to 60 percent slopes, eroded. This soil is moderately deep, very steep, and well drained. It is on the side slopes and ridgetops of humid volcanic uplands. Slopes are 100 to 600 feet long. The areas of the soil range from 20 to 200 acres.

Typically, the surface layer is dark reddish brown clay loam about 9 inches thick. The subsoil is multicolored clay loam 13 inches thick. The substratum is variegated clay loam 14 inches thick. Semiconsolidated volcanic rock is at a depth of 36 inches.

Included with this soil in mapping are small areas of Mucara soils, soils that have slopes of 20 to 40 percent, and severely eroded soils. Included soils make up 10 to 15 percent of the unit.

The permeability and available water capacity of this Morado soil are low. Runoff is very rapid. Natural fertility is medium. Reaction is medium acid in the surface layer and slightly acid in the subsoil and substratum.

Slope and an erosion hazard make this soil unsuitable for cultivated crops. Some small areas are in coffee, bananas, and pigeon peas. Crops on this soil respond well to applications of fertilizer.

The soil is well suited for pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of the equipment, and the soil is slippery and subject to landslides when wet. Controlling brush and weeds, hand planting, and fertilizing help to reduce the rate of seedling mortality.

Slope and the depth to rock are the main limitations of this soil for nonfarm development.

The capability subclass is VIIe.

MuE—Mucara clay, 20 to 40 percent slopes. This soil is moderately deep, steep, and well drained. It is on the side slopes and ridgetops of humid volcanic uplands. Slopes are 100 to 400 feet long. The areas of the soil range from 20 to 60 acres.

Typically, the surface layer is very dark grayish brown clay about 6 inches thick. The subsoil is dark yellowish brown and dark grayish brown clay 7 inches thick. The substratum is 14 inches thick. The upper part of the substratum is multicolored clay loam. The lower part is highly weathered volcanic rock. Semiconsolidated volcanic rock is at a depth of 27 inches.

Included with this soil in mapping are areas of Morado and Humatas soils that make up 10 to 15 percent of the unit.

The permeability of this Mucara soil is moderate, and the available water capacity is low. Runoff is rapid. The natural fertility is medium. Reaction is slightly acid in the surface layer and neutral in the subsoil and substratum. The subsoil has a high shrink-swell potential.

Some areas of this soil are used for such crops as coffee, tobacco, corn, plantains, and beans. However, an erosion hazard, the depth to rock, and slope are major limitations for farming. Cultivation is further limited because the soil is slippery when wet. Crops on this soil respond well to applications of fertilizer.

This soil is well suited for such pasture plants as pangolagrass and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The soil is well suited for Honduras pine, Honduras mahogany, and robusta eucalyptus. Slope limits the use of equipment, and the soil is slippery when wet. Controlling weeds and brush, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and the depth to rock are the main limitations of this soil for nonfarm development.

The capability subclass is VIe.

MuF—Mucara clay, 40 to 60 percent slopes. This soil is moderately deep, very steep, and well drained. It is on the side slopes and ridgetops of humid volcanic uplands. Slopes are 100 to 600 feet long. The areas of the soil range from 20 to 500 acres.

Typically, the surface layer is very dark grayish brown clay about 6 inches thick. The subsoil is dark yellowish brown and dark grayish brown clay 7 inches thick. The substratum is 14 inches thick. The upper part of the subsoil is multicolored clay loam. The lower part is highly weathered volcanic rock. Semiconsolidated volcanic rock is at a depth of 27 inches.

Included with this soil in mapping are areas of Morado soils, Humatas soils, and severely eroded soils. Included soils make up 10 to 15 percent of the unit.

The permeability of this Mucara soil is moderate, and the available water capacity is low. Runoff is rapid. Natural fertility is medium. Reaction is slightly acid in the surface layer and neutral in the subsoil and substratum. The subsoil has a high shrink-swell potential.

This soil is poorly suited for cultivated crops. Some small areas are used for coffee, tobacco, and pigeon peas and other food crops. However, an erosion hazard, slope, and the depth to rock are major limitations for farming.

The soil is well suited for such pasture plants as pangolagrass and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine, Honduras mahogany, and robusta eucalyptus, but slope limits the use of equipment, and the soil is slippery when wet. Controlling weeds and brush, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and the depth to rock are the main limitations of this soil for nonfarm development.

The capability subclass is VIIe.

NaD—Naranjo clay, 5 to 20 percent slopes. This soil is deep, sloping to moderately steep, and well drained. It is on the foot slopes and side slopes of limestone hills. Slopes are 100 to 800 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is very dark grayish brown clay about 8 inches thick. The subsoil is mainly yellowish brown and brownish yellow clay 14 inches thick. The substratum is brownish yellow and yellowish brown, mottled clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Colinas soils and exposed limestone bedrock that make up 5 to 10 percent of the unit.

The permeability of this Naranjo soil is moderate, and the available water capacity is high. Runoff is medium. Organic matter content is high. The soil is moderately alkaline throughout. The subsoil has a moderate shrink-swell potential.

This soil is used mainly for plantains, sugarcane, taniers, pigeon peas, and corn. Some small areas are used for avocados. Slope and an erosion hazard are the main limitations for farming. The clayey texture of the soil hinders cultivation. Crops on this soil respond well to applications of fertilizer.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. The erosion hazard is the main limitation. Use of proper stocking rates and deferred grazing, especially during the rainy season, and controlling weeds and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine, Honduras mahogany, mahoe, and robusta eucalyptus. Slope limits the use of equipment, and the soil is sticky and slippery when wet. Controlling weeds and brush, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope, the shrink-swell potential, and the clayey texture are the main limitations of the soil for nonfarm development.

The capability subclass is IIIe.

NaE—Naranjo clay, 20 to 40 percent slopes. This soil is deep, steep, and well drained. It is on the side slopes and ridgetops of limestone hills. Slopes are 100 to 600 feet long. The areas of the soil range from 20 to 150 acres.

Typically, the surface layer is very dark grayish brown clay about 8 inches thick. The subsoil is mainly yellowish brown and brownish yellow clay 14 inches thick. The substratum is multicolored brownish yellow and yellowish brown, mottled clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Colinas soils and exposed limestone bedrock that make up 5 to 10 percent of the unit.

The permeability of this Naranjo soil is moderate, and the available water capacity is high. Runoff is rapid. Organic matter content is high. The soil is moderately alkaline throughout. The subsoil has a moderate shrink-swell potential.

Some areas of this soil are used for such cultivated crops as plantains, sugarcane, taniers, pigeon peas, and corn; some small areas are used for avocados. Slope and an erosion hazard are the major limitations for farming. Cultivation is further limited because the soil is sticky when wet. Crops on this soil respond well to applications of fertilizer.

This soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The soil is well suited for Honduras pine, Honduras mahogany, mahoe, and robusta eucalyptus. Slope limits the use of equipment, and the soil is sticky and slippery when wet. Controlling weeds and brush, hand planting,

and fertilizing help to improve the survival rate of seedlings.

Slope, the clayey texture, and the shrink-swell potential are the main limitations of the soil for nonfarm development.

The capability subclass is IVe.

NaF—Naranjo clay, 40 to 60 percent slopes. This soil is deep, very steep, and well drained. It is on the side slopes and ridgetops of limestone hills. Slopes are 100 to 300 feet long. The areas of the soil range from 20 to 60 acres.

Typically, the surface layer is very dark grayish brown clay about 8 inches thick. The subsoil is mainly yellowish brown and brownish yellow clay 14 inches thick. The substratum is brownish yellow and yellowish brown, mottled clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Colinas soils and exposed limestone bedrock that make up 5 to 10 percent of the unit.

The permeability of this Naranjo soil is moderate, and the available water capacity is high. Runoff is very rapid. Organic matter content is high. The soil is moderately alkaline throughout. The subsoil has a moderate shrink-swell potential.

Slope and an erosion hazard make this soil generally unsuitable for cultivated crops, but some small areas are in pigeon peas, corn, and avocados. Cultivation is further limited because the soil is sticky. Crops on this soil respond well to applications of fertilizer.

The soil is well suited for such pasture plants as stargrass and pangolagrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The soil is well suited for Honduras pine, Honduras mahogany, mahoe, and robusta eucalyptus. However, slope limits the use of equipment, and the soil is sticky and slippery when wet. Controlling weeds and brush, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope, the shrink-swell potential, and the clayey texture limit this soil for most types of nonfarm development.

The capability subclass is VIe.

Pa—Palmar muck. This soil is deep, nearly level, and poorly drained. It is on bottom lands and in depressional areas in the humid coastal lowlands. Slopes are 100 to 800 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the soil is black and brown organic material to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Tiburones and Garrochales soils that make up 5 to 15 percent of the unit.

The permeability of this Palmar soil is slow, and the available water capacity is high. Runoff is slow. Reaction is neutral throughout the soil.

A high water table makes this soil poorly suited for cultivated crops. Most areas are in water-tolerant plants such as cattails, sedges, and papyrus. Some small areas are in sugarcane and native pasture. The soil is well suited for pangolagrass and paragrass. The main pasture management concerns are using proper stocking rates and deferred grazing and using fertilizers that have a low content of nitrogen and a high content of phosphorus and potash.

A high water table is the main limitation of the soil for most types of nonfarm development.

The capability subclass is VIIw.

PeF—Pellejas clay loam, 40 to 60 percent slopes. This soil is deep, very steep, and somewhat excessively drained. It is on the side slopes and ridgetops of uplands. Slopes are 200 to 1,000 feet long. The areas of the soil range from 50 to 500 acres.

Typically, the surface layer is dark brown clay loam about 6 inches thick. The subsoil is multicolored sandy clay loam and sandy loam 10 inches thick. The substratum is multicolored sandy loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of severely eroded Lirios soils and areas of Pellejas soils that have slopes of 20 to 40 percent. Also included are a few areas of exposed bedrock. Included areas make up 10 to 15 percent of the unit.

The permeability of this Pellejas soil is moderate in the upper layers and rapid in the lower layers. The available water capacity is moderate. Runoff is very rapid. Natural fertility is low to medium. Reaction is strongly acid throughout the soil.

Slope and an erosion hazard make this soil poorly suited for cultivated crops. The soil is mainly in coffee, tobacco, bananas, oranges, and pasture.

The soil is well suited for pangolagrass. Using proper stocking rates and deferred grazing, liming and fertilizing, and controlling weeds are the main pasture management concerns.

This soil is well suited for Honduras pine and robusta eucalyptus, but slope limits the use of equipment. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope is the main limitation of this soil for nonfarm development.

The capability subclass is VIIe.

PhC2—Perchas clay, 2 to 12 percent slopes, eroded. This soil is deep, gently sloping to sloping, and poorly drained. It is on low rolling hills and terraces. Slopes are 100 to 500 feet in length. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is 7 inches of dark brown, firm clay mottled with grayish brown. The subsoil and substratum have a combined thickness of 50 inches or more. They are mainly light gray and light olive gray clay mottled with yellowish brown.

Included with this soil in mapping are small areas of Moca soils that make up 5 to 15 percent of the unit.

The permeability of this Perchas soil is slow, and the available water capacity is high. Runoff is medium. Natural fertility is medium. Reaction throughout the soil is strongly acid. The soil has a high shrink-swell potential.

This soil is suitable for cultivated crops. Some areas are in sugarcane, taniers, plantains, bananas, and pasture. Poor drainage and erosion are the major limitations for farming. The soil is difficult to cultivate because it is sticky and wet. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and stargrass. The application of lime and fertilizer and the control of grazing when the soil is wet are the main pasture management concerns.

The high shrink-swell potential, wetness, and slope are the main limitations of this soil for nonfarm development.

The capability subclass is IIIw.

PhD2—Perchas clay, 12 to 20 percent slopes, eroded. This soil is deep, moderately steep, and poorly drained. It is on foot slopes and low terraces. Slopes are 100 to 400 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is 7 inches of dark brown, firm clay mottled with grayish brown. The subsoil and substratum have a combined thickness of 50 inches or more. They are mainly light gray and light olive gray clay mottled with yellowish brown.

Included with this soil in mapping are areas of Moca soils and severely eroded soils. Included soils make up 5 to 15 percent of the unit.

The permeability of this Perchas soil is slow, and the available water capacity is high. Runoff is rapid. Natural fertility is medium. Reaction throughout the soil is strongly acid. The soil has a high shrink-swell potential.

This soil is suitable for cultivated crops. It is used mainly for sugarcane, taniers, plantains, bananas, and pasture. Poor drainage and erosion are the major limitations for farming. The soil is difficult to cultivate because it is sticky and wet. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and stargrass. The application of lime and fertilizer, the control of grazing when the soil is wet, and the control of weeds are the main pasture management concerns.

Slope, the high shrink-swell potential, and wetness are the main limitations of the soil for community development.

The capability subclass is IVe.

Ps—Pits, gravel. This unit consists of open excavations and quarries from which gravel and limestone rock have been removed mainly for building construction, highways, and roadfill. Some of the limestone rock is used for agricultural purposes. Use of this unit requires onsite investigation.

Not assigned to a capability subclass.

Pt—Pits, sand. This unit consists of open excavations from which sand has been removed for industrial purposes and roadfill. The lower part of the excavated areas consists of clayey materials. During heavy rainfall these areas hold water for long periods. Use of these areas requires onsite investigation.

Not assigned to a capability subclass.

Re—Reilly gravelly silt loam. This soil is deep, nearly level, and excessively drained. It is on flood plains near streams and rivers. The areas range from 10 to 80 acres.

Typically, the surface layer is dark brown, friable gravelly silt loam about 7 inches thick. The substratum extends to a depth of 60 inches or more. It is dark yellowish brown, very friable gravelly loam to a depth of 13 inches and coarse sand and gravel at a depth of more than 13 inches.

Included with this soil in mapping are small areas of soils that have stones and boulders on the surface; soils that have a surface layer of loam or sandy loam; and frequently flooded, rocky soils. Included soils make up 10 to 15 percent of the unit.

The permeability of this Reilly soil is rapid, and the available water capacity is very low. Runoff is slow. Fertility is medium. Reaction in the surface layer is medium acid. This soil is subject to occasional flooding.

This soil is used for crops such as tobacco, peppers, corn, and beans. Some areas are in sugarcane. Flooding is the main hazard for crops. The soil is easy to cultivate, but sprinkler irrigation is needed in some places to overcome the very low available water capacity. Crops on this soil respond well to applications of fertilizer.

This soil is well suited for such pasture plants as pangolagrass and merkergrass. Some areas are in native pasture and brush. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The hazard of occasional flooding is the main limitation of the soil for nonfarm development.

The capability subclass is IVs.

RIC—Rio Lajas sand, 2 to 12 percent slopes. This soil is deep, gently sloping to sloping, and somewhat excessively drained. It is in small valleys and on undulating hills on the coastal plains. Slopes are 100 to 800 feet long. The areas of the soil range from 10 to 80 acres.

Typically, the surface layer is dark reddish brown sand about 17 inches thick. The subsurface layer is dark reddish brown loamy sand 9 inches thick. The subsoil extends to a depth of more than 60 inches. It is dark reddish brown and dark red sandy loam to a depth of 64 inches and dark red sandy clay loam at a depth of more than 64 inches.

Included with this soil in mapping are small areas of Carrizales and Guerrero soils that make up 5 to 10 percent of the unit.

The permeability of this Rio Lajas soil is rapid, and the available water capacity is very low. Runoff is slow to medium. Natural fertility is low. The reaction is slightly acid in the surface layer and neutral in the lower layers.

Low fertility, low available water capacity, and rapid permeability limit this soil for cultivated crops. The soil is mainly used for sweet potatoes, cassavas, and pigeon peas. Some small areas are in coconuts and tobacco. Crops on this soil respond to fertilizer applications, but irrigation is needed in some areas.

This soil is well suited for such pasture plants as stargrass, pangolagrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil has few limitations for most types of nonfarm development.

The capability subclass is IVs.

Rm—Riverwash. This unit consists of nearly level flood plains adjacent to rivers and streams. The areas are mainly a mixture of boulders, cobbles, gravel, and sand and are frequently flooded. These areas are generally unsuitable for farming and support little or no vegetation except some brushy trees and native grasses.

The capability subclass is VIIIs.

Ro—Rock outcrop, limestone. This unit consists of steep to very steep hills where exposed limestone bedrock covers up to 95 percent of the surface. The soils in the unit have various textures, colors, and depths. The unit is generally unsuitable for farming and has very little vegetation.

The capability subclass is VIIIs.

Rr—Rock outcrop, sandstone. This unit consists of steep and very steep coastal hills and cliffs. Exposed sandstone bedrock covers 90 to 95 percent of the surface. The soils in the unit are mainly very shallow and have various textures and colors. The unit is unsuitable for farming and supports little or no vegetation.

The capability subclass is VIIIs.

RsF—Rock outcrop-San German complex, 20 to 60 percent slopes. This complex consists of areas of exposed limestone bedrock and shallow, well drained soils on hills. The areas range from 50 to 200 acres. The complex is about 60 percent exposed rock, 30 percent moderately steep to very steep San German soils, and 10 percent other soils. The exposed rock and San German soils are so mixed that it was not practical to map them separately.

Typically, the surface layer of the San German soils is very dark grayish brown gravelly clay about 3 inches thick. The subsurface layer is very dark brown very gravelly clay 7 inches thick. Hard limestone bedrock is at a depth of 10 inches.

Included with this complex in mapping are small areas of Colinas and Espinosa soils.

The San German soils have rapid permeability and low available water capacity. Runoff is rapid. Reaction is moderately alkaline. Natural fertility is medium.

Slope, the exposed rock, and the depth to rock make this complex poorly suited for cultivated crops. The complex is mainly used for pasture. Pangolagrass, guineagrass, and native pasture are the main species. Some areas are in brush or are wooded. Using proper stocking rates and deferred grazing are the main pasture management concerns.

The slope and depth to rock also limit the complex for nonfarm development.

The capability subclass is VIIs.

RtF—Rock outcrop-Tanama complex, 12 to 60 percent slopes. This complex consists of areas of exposed limestone bedrock and shallow, well drained soils on hills. The areas range from 100 to 1,500 acres. The complex is about 65 percent exposed rock, 30 percent moderately steep to very steep Tanama soils, and 5 percent other soils. The exposed rock and Tanama soils are so mixed that it was not practical to map them separately.

Typically, the surface layer of the Tanama soils is dark reddish brown, firm clay about 5 inches thick. The subsoil is mainly dark reddish brown and yellowish red clay 11 inches thick. Limestone bedrock is at a depth of 16 inches.

Included with this complex in mapping are small areas of Bayamon, Matanzas, Almirante, and Espinosa soils.

The Tanama soils have moderate permeability and low available water capacity. Runoff is rapid. Natural fertility is low. Reaction is slightly acid in the surface layer and neutral in the lower layer. Bedrock is generally at a depth of less than 20 inches.

Slope, the areas of exposed rock, and the depth to rock make this complex unsuitable for cultivated crops. Some areas are in pasture. Pangolagrass and native grasses are the main species. Most of the complex is in brush or is wooded. Using proper stocking rates and deferment of grazing are the main pasture management concerns.

Slope and the depth to rock limit this complex for most types of nonfarm development.

The capability subclass is VIIs.

SaB—Sabana Seca clay, 2 to 5 percent slopes. This soil is deep, gently sloping, and poorly drained. It is on coastal plains and in valleys. Slopes range from 100 to 1,200 feet long. The areas of the soil range from 50 to 100 acres.

Typically, the surface layer is very dark grayish brown clay about 9 inches thick. The subsoil is firm, multicolored and mottled clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Vega Alta and Almirante soils that make up 10 to 15 percent of the unit.

The permeability of this Sabana Seca soil is very slow. The available water capacity is high. Runoff is slow. Natural fertility is medium. Reaction throughout the soil is very strongly acid.

Wetness makes this soil generally unsuitable for cultivated crops, but some small areas are in sugarcane and food crops. Tillage is restricted because the soil is sticky when wet. Crops on the soil respond well to applications of lime and fertilizer.

The soil is well suited for pangolagrass, common bermudagrass, paragrass, and merkergrass, but drainage is needed. Using proper stocking rates and deferred grazing, controlling weeds, liming and fertilizing, and controlling grazing when the soil is too wet are the main pasture management concerns.

The wetness and clayey texture of the soil are the main limitations for nonfarm development.

The capability subclass is IIIw.

SgD—San German gravelly clay loam, 5 to 20 percent slopes. This soil is very shallow, sloping to moderately steep, and well drained. It is on side slopes and ridgetops. Slopes range from 20 to 300 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is very dark grayish brown gravelly clay loam about 3 inches thick. The subsurface layer is very dark brown very gravelly clay loam 7 inches thick. Hard limestone is at a depth of 10 inches.

Included with this soil in mapping are small areas of Colinas and Santa Clara soils that make up 5 to 10 percent of the unit.

The permeability of this San German soil is rapid. The available water capacity is very low. Runoff is moderate. Reaction is moderately alkaline, and natural fertility is medium.

The depth to rock and low available water capacity make this soil poorly suited for cultivated crops. The soil is well suited for pangolagrass, guineagrass, and native pasture. Using proper stocking rates and deferment of grazing are the main pasture management concerns.

Slope and the depth to rock are the main limitations of the soil for nonfarm development.

The capability subclass is VIs.

SgF—San German gravelly clay loam, 20 to 60 percent slopes. This soil is very shallow, steep to very steep, and well drained. It is on ridgetops and side slopes. Slopes are 20 to 200 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is very dark grayish brown gravelly clay loam about 3 inches thick. The subsurface layer is very dark brown very gravelly clay loam 7 inches thick. Hard limestone is at a depth of 10 inches.

Included with this soil in mapping are small areas of Colinas and San Sebastian soils that make up 5 to 15 percent of the unit.

The permeability of this San German soil is rapid, and the available water capacity is very low. Runoff is rapid. Reaction is moderately alkaline, and natural fertility is medium.

Slope and the depth to rock make this soil poorly suited for cultivated crops. The soil is well suited for pangolagrass and guineagrass, and some areas are in brush and native pasture. Using proper stocking rates and deferment of grazing are the main pasture management concerns.

Slope and the depth to rock are the main limitations of the soil for nonfarm development.

The capability subclass is VIIs.

SmF—San Sebastian gravelly clay, 20 to 60 percent slopes. This soil is deep, steep to very steep, and well drained. It is on hilltops and side slopes. Slopes are 100 to 500 feet long. The areas of the soil range from 50 to 300 acres.

Typically, the surface layer is dark yellowish brown very gravelly clay about 6 inches thick. The subsoil is strong brown, brownish yellow, and yellowish red very gravelly clay 25 inches thick. The substratum is brownish yellow and yellowish red gravelly clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Tanama, Colinas, and Soller soils that make up 10 to 15 percent of the unit.

The permeability of this San Sebastian soil is moderate. The available water capacity is high. Runoff is rapid. Natural fertility is medium. Reaction in the surface layer and subsoil is moderately alkaline.

Slope, erosion, and cobblestones and gravel in the surface layer make this soil poorly suited for cultivated crops. The lower slopes in some areas are used for pigeon peas, plantains, corn, and sugarcane. A large area is in brush and native pasture.

The soil is well suited for pasture plants such as pangolagrass, stargrass, and merkergrass. If cleared, the areas in brush are suitable for pasture. Using proper stocking rates and deferred grazing, fertilizing, and controlling weeds are the main pasture management concerns. Controlled grazing helps the grasses to reseed.

This soil is well suited for Honduras mahogany. Slope, which limits the use of equipment, and a high rate of seedling mortality are the main management concerns. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope is the main limitation of this soil for nonfarm development.

The capability subclass is VIIe.

SnC—Santa Clara clay, 2 to 12 percent slopes. This soil is moderately deep, gently sloping to sloping, and well drained. It is on foot slopes and small hills. Slopes are 20 to 300 feet long. The areas of the soil range from 20 to 80 acres.

Typically, the surface layer is very dark grayish brown, firm clay about 9 inches thick. The subsoil is dark grayish brown and yellowish brown silty clay 16 inches thick. The substratum is yellowish brown silty clay 8 inches thick. Hard limestone is at a depth of 33 inches.

Included with this soil in mapping are small areas of San German soils and soils that have slopes of 12 to 20 percent. Also included are small areas of exposed limestone bedrock. Included areas make up 5 to 10 percent of the unit.

The permeability of this Santa Clara soil is moderate. The available water capacity is moderate. Runoff is moderate. Natural fertility is medium to high. Reaction is slightly acid in the surface layer and neutral to mildly alkaline in the subsoil and substratum.

This soil is well suited for pigeon peas, plantains, and sugarcane. Some areas are used for citrus fruits and avocados. The clayey texture of the surface layer and subsoil somewhat hinders cultivation.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. Applying fertilizer, using proper stocking rates and deferred grazing, and controlling weeds are the chief pasture management concerns.

The soil is well suited for Honduras mahogany, Honduras pine, teak, and mahoe. Controlling brush and weeds and applying fertilizer help to improve the survival rate of seedlings.

The depth to rock is the main limitation of the soil for nonfarm development.

The capability subclass is IIIe.

SoC—Soller clay, 5 to 12 percent slopes. This soil is moderately deep, sloping, and well drained. It is on low, undulating hills, on foot slopes, and on side slopes. Slopes are 100 to 500 feet long. The areas of the soil range from 20 to 50 acres.

Typically, the surface layer is very dark gray clay about 5 inches thick. The subsoil is very dark grayish brown clay 5 inches thick. The substratum is dark brown and very pale brown clay about 15 inches thick. Hard fragmental limestone is at a depth of 25 inches.

Included with this soil in mapping are small areas of Colinas soils. Also included are areas with gravel on the surface and areas of exposed bedrock. Included areas make up 5 to 10 percent of the unit.

The permeability of this Soller soil is moderate, and the available water capacity is low. Runoff is medium. Natural fertility is medium to high. Reaction in the surface layer and subsoil is neutral to mildly alkaline. The subsoil has a high shrink-swell potential.

This soil is well suited for cultivated crops. It is mainly used for sugarcane, taniers, avocados, pigeon peas, corn, and other crops. The clayey texture of the soil, which hinders cultivation, is the main limitation. Crops on this soil respond well to applications of fertilizer.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. Some areas are in brush and native pasture. Using proper stocking rates and deferred grazing, controlling weeds, fertilizing, and controlling grazing when the soil is wet are the main pasture management concerns.

This soil is well suited for Honduras pine, Honduras mahogany, teak, and mahoe. The use of equipment is limited because the soil is slippery when wet. Controlling brush and weeds, fertilizing, and hand planting help to improve the survival rate of seedlings.

The depth to rock and the high shrink-swell potential are the main limitations of the soil for nonfarm development.

The capability subclass is IVe.

SoD—Soller clay, 12 to 20 percent slopes. This soil is moderately deep, moderately steep, and well drained. It is on small hills and side slopes. Slopes are 100 to 400 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is very dark gray clay about 5 inches thick. The subsoil is very dark grayish brown clay 5 inches thick. The substratum is dark brown and very pale brown clay 15 inches thick. Hard fragmental limestone is at a depth of 25 inches.

Included with this soil in mapping are small areas of Colinas soils. Also included are areas with gravel and cobblestones on the surface and areas of exposed limestone bedrock. Included areas make up 5 to 15 percent of the unit.

The permeability of this Soller soil is moderate, and the available water capacity is low. Runoff is rapid. Natural fertility is moderate to high. Reaction in the surface layer and subsoil is neutral to mildly alkaline. The subsoil has a high shrink-swell potential.

Some areas of this soil are used for such cultivated crops as pigeon peas, plantains, and taniers. A few areas are used for avocados. Slope and an erosion hazard are the main limitations for cultivation. Crops on this soil respond well to applications of fertilizer.

This soil is well suited for such pasture plants as pangolagrass and stargrass. If cleared, some areas that

are in brush are suitable for pasture. Using proper stocking rates and deferred grazing, controlling weeds, fertilizing, and controlling grazing when the soil is wet are the main pasture management concerns.

The soil is well suited for Honduras pine, Honduras mahogany, teak, and mahoe. Slope limits the use of equipment, and the soil is slippery when wet. Controlling brush and weeds, fertilizing, and hand planting help to improve the survival rate of seedlings.

Slope, the depth to rock, and the high shrink-swell potential are the main limitations of the soil for nonfarm development.

The capability subclass is VIe.

SoF—Soller clay, 20 to 60 percent slopes. This soil is moderately deep, steep to very steep, and well drained. It is on ridgetops and side slopes. Slopes are 100 to 300 feet long. The areas of the soil range from 50 to 100 acres.

Typically, the surface layer is very dark gray clay about 5 inches thick. The subsoil is very dark grayish brown clay 5 inches thick. The substratum is dark brown and very pale brown clay 15 inches thick. Hard fragmental limestone is at a depth of 25 inches.

Included with this soil in mapping are small areas of Colinas soils. Also included are areas of severely eroded soils and areas of exposed bedrock. Included areas make up 5 to 15 percent of the unit.

The permeability of this Soller soil is moderate, and the available water capacity is low. Runoff is rapid. Natural fertility is moderate to high. Reaction in the surface layer and subsoil is neutral or mildly alkaline. The subsoil has a high shrink-swell potential.

Slope and an erosion hazard make this soil generally unsuitable for cultivated crops, but some small areas are in pigeon peas, corn, and taniers. The soil is well suited for such pasture plants as pangolagrass and stargrass. Some areas are in brush and native pasture. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras mahogany, but slope limits the use of equipment, and the soil is slippery when wet. Controlling brush, fertilizing, and hand planting help to reduce a high rate of seedling mortality.

Slope and the depth to rock are the main limitations of the soil for nonfarm development.

The capability subclass is VIIe.

SpD—Soller cobbly clay, 12 to 20 percent slopes. This soil is moderately deep, moderately steep, and well drained. It is on small, undulating hills and side slopes. Slopes are 100 to 500 feet long. The areas of the soil range from 20 to 100 acres.

Typically, the surface layer is very dark gray cobbly clay about 5 inches thick. The subsoil is very dark grayish brown clay 5 inches thick. The substratum is dark brown and very pale brown clay 15 inches thick. Hard fragmental limestone is at a depth of 25 inches.

Included with this soil in mapping are small areas of Soller soils where the subsoil is exposed at the surface and small areas of Colinas soils. Also included are areas of exposed limestone bedrock. Included areas make up 5 to 10 percent of the unit.

The permeability of this Soller soil is moderate, and the available water capacity is low. Runoff is rapid. Natural fertility is medium. Reaction in the surface layer and subsoil is moderately alkaline. The subsoil has a high shrink-swell potential.

The cobblestones in the surface layer hinder tillage and make this soil poorly suited for cultivated crops. Some small areas are used for pigeon peas, corn, and pumpkins.

This soil is well suited for such pasture plants as pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The soil is well suited for Honduras mahogany, but slope limits the use of equipment. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope, the high shrink-swell potential, and the cobblestones in the surface layer are the main limitations of the soil for nonfarm development.

The capability subclass is VIe.

SpF—Soller cobbly clay, 20 to 60 percent slopes. This soil is moderately deep, steep to very steep, and well drained. It is on side slopes and ridgetops. Slopes are 100 to 400 feet long. The areas of the soil range from 20 to 50 acres.

Typically, the surface layer is very dark gray cobbly clay about 5 inches thick. The subsoil is very dark grayish brown clay 5 inches thick. The substratum is dark brown and very pale brown clay 15 inches thick. Hard fragmental limestone is at a depth of 25 inches.

Included with this soil in mapping are areas of Soller soils where the subsoil is exposed at the surface and small areas of Colinas soils. Also included are small areas of exposed bedrock. Included areas make up 5 to 10 percent of the unit.

The permeability of this Soller soil is moderate, and the available water capacity is low. Runoff is very rapid. Natural fertility is medium. Reaction in the surface layer and subsoil is moderately alkaline.

Slope, the depth to rock, and the cobblestones in the surface layer make this soil poorly suited for cultivated crops. Some small areas are used for pigeon peas, corn, and other cultivated crops. Crops grown in these areas respond well to applications of fertilizer.

This soil is well suited for such pasture plants as pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The soil is well suited for Honduras mahogany, but slope limits the use of equipment. Planting on the contour helps to reduce runoff and erosion. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and the depth to rock limit this soil for most types of nonfarm development.

The capability subclass is VIIe.

SrF—Soller-Rock outcrop complex, 5 to 60 percent slopes. This complex consists of sloping to very steep, well drained soils and areas of exposed limestone bedrock. The complex is on ridgetops and side slopes. Slopes are 100 to 500 feet long. The areas of the complex range from 50 to 300 acres and consist of 60 percent moderately deep Soller soils, 30 percent exposed bedrock, and 10 percent other soils. The Soller soils and exposed bedrock are so intermingled that it was not practical to map them separately.

Typically, the Soller soils have a surface layer of very dark gray clay about 5 inches thick. The subsoil is very dark grayish brown clay 5 inches thick. The substratum is dark brown and very pale brown clay 15 inches thick. Hard fragmental limestone is at a depth of 25 inches.

Included with this complex in mapping are small areas of Colinas, San German, Espinosa, and Almirante soils. Also included are areas of soils with a surface layer of cobbly clay loam and spots of severely eroded soils.

The Soller soils have moderate permeability and low available water capacity. Runoff is moderate to very rapid. Natural fertility is medium to high. Reaction in the surface layer and subsoil is neutral to mildly alkaline.

Slope and the areas of exposed rock make this complex poorly suited for cultivated crops. Some small areas are used for pigeon peas, corn, avocados, pumpkins, and other crops, but cultivation must be done by hand.

Pangolagrass, stargrass, and native pasture are the main pasture grasses on this complex. Using proper stocking rates and deferred grazing and fertilizing are the main pasture management concerns.

This complex is suited for Honduras pine, but slope limits the use of equipment.

Slope, the areas of exposed rock, and the depth to rock are the main limitations of the complex for nonfarm development.

The capability subclass is VIIs.

TaB—Tanama clay, 2 to 5 percent slopes. This soil is shallow, gently sloping, and well drained. It is in small valleys between limestone hills. Slopes are 100 to 1,200 feet long. The areas of the soil range from 10 to 60 acres.

Typically, the surface layer is dark reddish brown, firm clay about 5 inches thick. The subsoil is mainly dark reddish brown and yellowish red clay 11 inches thick. Limestone bedrock is at a depth of 16 inches.

Included with this soil in mapping are small areas of Bayamon and Matanzas soils and areas of exposed bedrock. Included areas make up 5 to 10 percent of the unit.

The permeability of this Tanama soil is moderate, and the available water capacity is low. Runoff is slow. Natural fertility is low. Reaction is slightly acid in the surface layer and neutral in the subsoil.

This soil is well suited for cultivated crops. Some areas are used for sugarcane, plantains, sweet potatoes, and other crops. The depth to rock and the clayey texture are the main limitations for cultivation. Crops on this soil respond well to applications of fertilizer.

The soil is well suited for pangolagrass, stargrass, and merkergrass. Some areas are in native pasture. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine, Honduras mahogany, teak, and mahoe. The depth to rock is the main limitation. Controlling brush and weeds, hand planting, and fertilizing help improve the survival rate of seedlings.

The depth to rock and low strength are the main limitations of the soil for nonfarm development.

The capability subclass is IIIs.

TaC2—Tanama clay, 5 to 12 percent slopes, eroded. This soil is shallow, sloping, and well drained. It is on foot slopes and low, rolling hills. Slopes are 100 to 500 feet long. The areas of the soil range from 10 to 80 acres.

Typically, the surface layer is dark reddish brown, firm clay about 5 inches thick. The subsoil is mainly dark reddish brown and yellowish red clay 11 inches thick. Limestone bedrock is at a depth of 16 inches.

Included with this soil in mapping are small areas of Bayamon and Matanzas soils and areas of exposed limestone bedrock. Included areas make up 5 to 10 percent of the unit.

The permeability of this Tanama soil is moderate. The available water capacity is low. Runoff is medium. Natural fertility is low. Reaction is slightly acid in the surface layer and neutral in the subsoil.

Some areas of this soil are used for cultivated crops such as plantains, taniers, and pigeon peas. A few areas are used for avocados, and a few for sugarcane. The depth to rock and slope are the main limitations for cultivation. Crops on this soil respond well to applications of fertilizer.

The soil is well suited for pangolagrass, stargrass, and merkergrass. Some areas are in native pasture and brush. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine, Honduras mahogany, teak, and mahoe. The depth to rock and

slope limit the use of equipment. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and the depth to rock are the main limitations of the soil for nonfarm development.

The capability subclass is IVs.

TaD2—Tanama clay, 12 to 20 percent slopes, eroded. This soil is shallow, moderately steep, and well drained. It is on low, rolling hills. Slopes are 100 to 300 feet long. The areas of the soil range from 10 to 60 acres.

Typically, the surface layer is dark reddish brown, firm clay about 5 inches thick. The subsoil is mainly dark reddish brown and yellowish red clay 11 inches thick. Limestone bedrock is at a depth of 16 inches.

Included with this soil in mapping are small areas where the subsoil is exposed at the surface, areas with slopes of 20 to 60 percent, and areas of exposed limestone bedrock. Included soils make up 10 to 15 percent of the unit.

The permeability of this Tanama soil is moderate. The available water capacity is low. Runoff is rapid. Natural fertility is low. Reaction is slightly acid in the surface layer and neutral in the subsoil.

Slope and the depth to rock make this soil poorly suited for cultivated crops. Some small areas are in plantains, taniers, pigeon peas, or avocados.

This soil is mainly in native pasture and brush and is well suited for pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

The soil is well suited for Honduras pine and Honduras mahogany. Slope and the depth to rock limit the use of equipment. Controlling brush and weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

Slope and the depth to rock are the main limitations of the soil for nonfarm development.

The capability subclass is VIs.

Tb—Tiburones muck. This soil is deep, nearly level, and poorly drained. It is on the bottom lands and in depressional areas of the coastal lowlands. The areas range from 20 to 150 acres.

Typically, this soil is black and very dark brown organic material.

Included with this soil in mapping are small areas of Palmar and Garrochales soils that make up 5 to 15 percent of the unit.

The permeability of this Tiburones soil is slow, and the available water capacity is high. Runoff is slow. The organic matter content is high. Reaction in the surface layer is medium acid.

A high water table makes this soil poorly suited for cultivated crops. Most areas are in water-tolerant plants and native pasture. Some small areas are in sugarcane.

The soil is well suited for such pasture plants as pangolagrass and paragrass. Using proper stocking rates and deferred grazing and applying fertilizers that are low in nitrogen and high in phosphorus and potash are the main pasture management concerns.

Wetness is the main limitation of the soil for nonfarm development.

The capability subclass is VIIw.

To—Toa silty clay loam. This soil is deep, nearly level, and well drained. It is on flood plains. The areas range from 50 to 500 acres.

Typically, the surface and subsurface layers are dark brown silty clay loam with a combined thickness of 16 inches. The subsoil is mottled, brown silty clay loam 15 inches thick. The substratum is mottled, dark yellowish brown and dark brown silty clay loam to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Coloso, Bajura, and Vivi soils that make up 5 to 10 percent of the unit.

The permeability of this Toa soil is moderate, and the available water capacity is high. Runoff is slow. Natural fertility and organic matter content are high. Reaction throughout the soil is neutral.

The soil is well suited for most cultivated crops and is mainly used for sugarcane (fig. 3). Crops respond well to applications of fertilizer.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. A hazard of flooding is the main limitation. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns.

A flooding hazard and low strength are the main limitations of the soil for nonfarm development.

The capability class is I.

TP—Tropopsamments, hummocky. This unit consists of deep, sloping, excessively drained soils on ridges and small hills along the coast. Slopes range from 5 to 12 percent, and the areas of the unit range from 20 to 80 acres. The soils are generally sandy throughout.

Included with this unit in mapping are small areas of Catano and Carrizales soils that make up 5 to 10 percent of the unit.

The permeability of these Tropopsamments is very rapid. The available water capacity is very low. Runoff is very slow, and the level of natural fertility is very low. Reaction is mildly alkaline to moderately alkaline throughout.

The very low available water capacity and very rapid permeability make these soils generally unsuitable for farming, and low strength and poor stability make them generally unsuitable for nonfarm development. Some

Figure 3.—Sugarcane on an area of Toa silty clay loam.

areas of the unit are suitable as a source of sand for construction (fig. 4).

The capability subclass is VIIIs.

Ur—Urban land. This unit consists mainly of housing projects, shopping centers, and industrial areas. The soils in the unit are mostly in yards, parks, and open areas around and between the buildings. The texture, color, and depth of these soils is variable. The soils are used for lawns, shade trees, fruit trees, vegetable gardens, ornamental trees and shrubs, and playgrounds.

Not assigned to a capability subclass.

VaB—Vega Alta sandy clay loam, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 50 to 150 feet in length. The areas of the soil range from 10 to 40 acres.

Typically, the surface layer is dark brown, firm sandy clay loam about 8 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Almirante and Espinosa soils that make up 10 to 15 percent of the unit.

The permeability of this Vega Alta soil is moderate, and the available water capacity is high. Runoff is medium. Natural fertility is medium. Reaction is very strongly acid in the surface layer and extremely acid in the subsoil.

This soil is well suited for sugarcane and has good tilth. Some areas are used for pineapples and plantains. Crops on the soil respond well to applications of lime and fertilizer.

The soil is well suited for pangolagrass, stargrass, paragrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns. Some areas need supplemental irrigation during prolonged periods of drought.

This soil has few limitations for most types of nonfarm development.

The capability subclass is IIe.

VaC2—Vega Alta sandy clay loam, 5 to 12 percent slopes, eroded. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 50 to 150 feet in length. The areas of the soil range from 10 to 80 acres.

Typically, the surface layer is dark brown, firm sandy clay loam about 8 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are areas of Almirante and Espinosa soils that make up 10 to 15 percent of the unit.

The permeability of this Vega Alta soil is moderate, and the available water capacity is high. Runoff is medium. Natural fertility is medium. Reaction is very strongly acid in the surface layer and subsoil.

This soil is mainly used for sugarcane and has good tilth. Some areas are used for pineapples and plantains. Slope and an erosion hazard are the major limitations. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for pangolagrass, stargrass, paragrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns. Some areas need supplemental irrigation during prolonged periods of drought.

Slope is the main limitation of this soil for nonfarm development.

The capability subclass is IIIe.

VcB—Vega Alta clay, 2 to 5 percent slopes. This soil is deep, gently sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 50 to 200 feet long. The areas of the soil range from 10 to 80 acres.

Typically, the surface layer is dark brown, firm clay about 8 inches thick. The subsoil is multicolored clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Almirante and Espinosa soils that make up 5 to 10 percent of the unit.

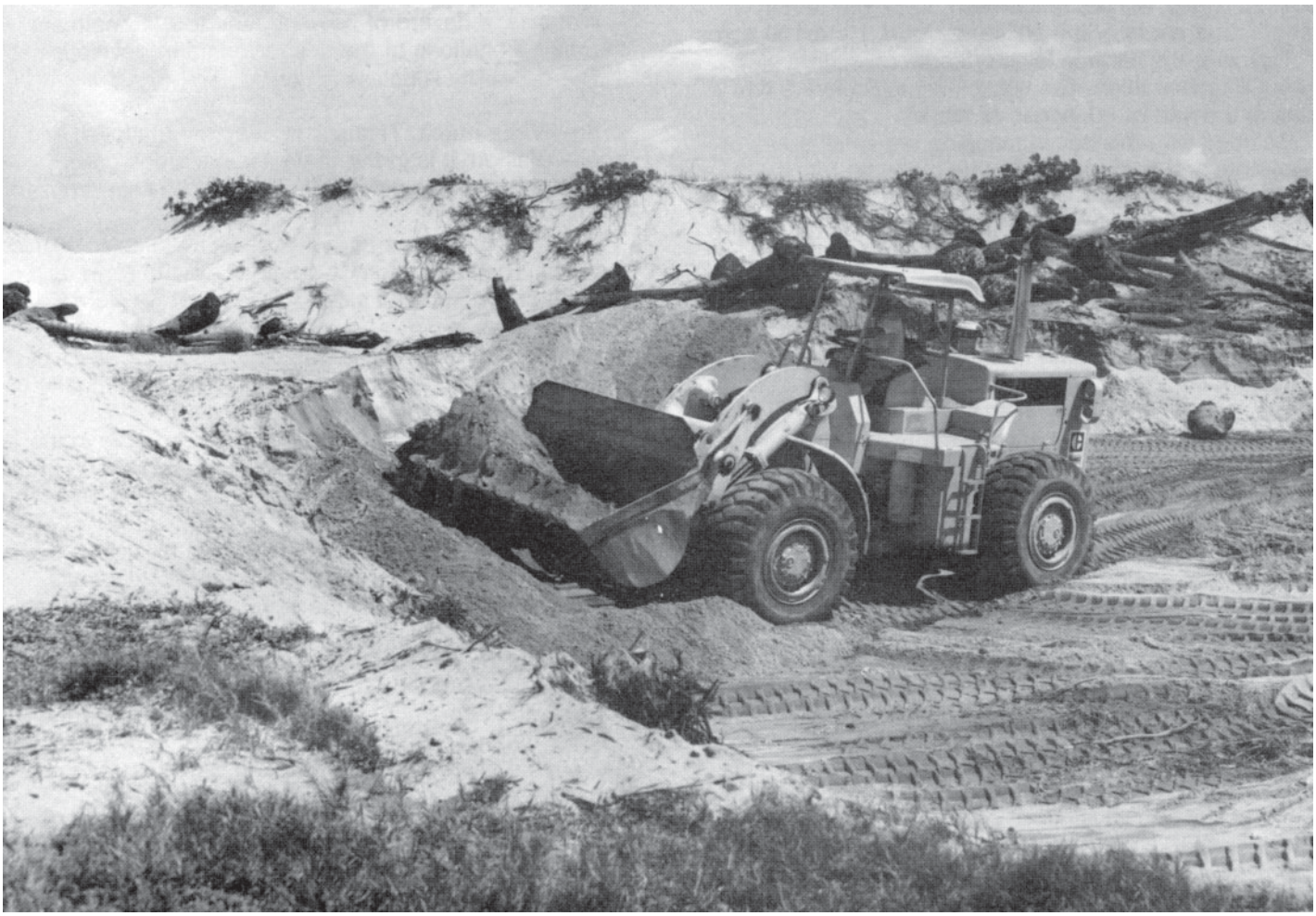


Figure 4.—This area of Tropopsamments, hummocky, provides sand for construction.

The permeability of this Vega Alta soil is moderate, and the available water capacity is high. Runoff is medium. Natural fertility is medium. Reaction is very strongly acid in the surface layer and extremely acid in the subsoil.

This soil is used mainly for sugarcane. Some areas are in pineapples, plantains, and crops. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass, stargrass, paragrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns. Some areas need supplemental irrigation during prolonged periods of drought.

The clayey texture is the main limitation of the soil for nonfarm development.

The capability subclass is IIe.

VcC2—Vega Alta clay, 5 to 12 percent slopes, eroded. This soil is deep, sloping, and well drained. It is in small valleys between limestone hills and on the coastal plains. Slopes range from 50 to 150 feet in length. The areas of the soil range from 10 to 100 acres.

Typically, the surface layer is dark brown, firm clay about 8 inches thick. The subsoil is multicolored, firm clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Almirante and Espinosa soils that make up 5 to 10 percent of the unit.

The permeability of this Vega Alta soil is moderate, and the available water capacity is high. Runoff is medium. Natural fertility is medium. Reaction is very strongly acid in the surface layer and extremely acid in the subsoil.

This soil is mainly used for sugarcane. Some small areas are in pineapples, plantains, and other crops. Slope and an erosion hazard are the major limitations. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for pangolagrass, stargrass, paragrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns. Some areas need supplemental irrigation during prolonged periods of drought.

Slope, the clayey texture, and low strength are the main limitations of the soil for nonfarm development.

The capability subclass is IIIe.

VeB—Vega Baja clay, 2 to 5 percent slopes. This soil is deep, gently sloping, and somewhat poorly drained. It is on alluvial fans and on the coastal plains. The areas range from 50 to 80 acres.

Typically, the surface layer is very dark grayish brown, firm clay about 8 inches thick. The subsurface layer is very dark grayish brown, mottled clay 9 inches thick. The subsoil is firm, multicolored clay 31 inches thick. The substratum is light olive gray and light greenish gray, mottled clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Coloso and Bajura soils and a few wet spots. Included areas make up 5 to 10 percent of the unit.

The permeability of this Vega Baja soil is slow. The available water capacity is high. Runoff is slow. Natural fertility and organic matter content are high. Reaction is strongly acid in the surface layer and neutral in the lower layers. The subsoil has a moderate shrink-swell potential.

Drained areas of this soil are well suited for cultivated crops and are used mainly for sugarcane. Undrained areas are suitable for rice. Crops on this soil respond well to applications of fertilizer.

The soil is well suited for such pasture plants as stargrass, paragrass, and pangolagrass, but drainage is necessary. Using proper stocking rates and deferred grazing, controlling weeds, and fertilizing are the main pasture management concerns. Control of grazing is especially important when the soil is too wet.

Wetness, a hazard of flooding, and low strength are the main limitations of the soil for nonfarm development.

The capability subclass is IIw.

Vg—Vigia muck. This soil is deep, nearly level, and poorly drained. It is in the depressional areas and lowlands of the coastal plains. The areas range from 10 to 80 acres.

Typically, the upper 18 inches is black, friable organic material. The substratum is gray, yellowish brown, and reddish brown, mottled clay to a depth of 60 inches or more.

Included with this soil in mapping are small areas of Jareales, Tiburones, and Garrochales soils that make up 5 to 10 percent of the unit.

The permeability of this Vigia soil is moderate in the organic material and slow in the mineral material. The available water capacity is high. Runoff is slow. Reaction is acid throughout the soil.

Wetness makes this soil poorly suited for cultivated crops. Some areas are in sugarcane, but drainage is needed. Most of the acreage is in pasture and in plants that thrive in water. The soil is well suited for paragrass and caribgrass. Using proper stocking rates and deferred grazing and using fertilizers that are low in nitrogen content and high in potash and phosphorus are the main pasture management concerns.

Wetness and a hazard of flooding limit this soil for most types of nonfarm development.

The capability subclass is VIw.

Vm—Vivi loam. This soil is deep, nearly level, and somewhat excessively drained. It is on alluvial flood plains. The areas range from 10 to 100 acres.

Typically, the surface layer is dark brown loam about 7 inches thick. The subsoil is dark yellowish brown loam 7 inches thick. The substratum extends to a depth of 60 inches or more. It is dark yellowish brown loam, sandy loam, and loamy sand to a depth of 30 inches and yellowish brown sand at a depth of more than 30 inches.

Included with this soil in mapping are small areas of Toa and Reilly soils that make up 5 to 10 percent of the unit.

The permeability of this Vivi soil is moderately rapid in the upper part and rapid in the lower part. Available water capacity is moderate. Natural fertility is high. Reaction is very strongly acid in the surface layer and subsoil and neutral in the substratum.

The soil is well suited for most cultivated crops. It is mainly used for sugarcane. The available water capacity and a hazard of flooding are the management concerns. Supplemental irrigation is needed in some areas during long periods of drought. Crops on this soil respond well to applications of fertilizer and lime.

The soil is suitable for such pasture plants as pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, liming and fertilizing, and controlling weeds are the main pasture management concerns.

The hazard of flooding is the main limitation of the soil for nonfarm development.

The capability subclass is IIs.

VoC2—Voladora clay, 5 to 12 percent slopes, eroded. This soil is deep, sloping, and well drained. It is on the terraces and ridgetops of humid volcanic uplands. Slopes range from 200 to 500 feet long. The areas of the soil range from 20 to 80 acres.

Typically, the surface layer is dark reddish brown, firm clay about 8 inches thick. The subsoil is red, firm clay 25 inches thick. The substratum is multicolored clay loam saprolite to a depth of 50 inches or more.

Included with this soil in mapping are small areas of Daguey soils that make up 5 to 8 percent of the unit.

The permeability of this Voladora soil is moderate. The available water capacity is high. Runoff and natural fertility are medium. Reaction is strongly acid in the surface layer and extremely acid in the lower layers.

This soil is well suited for such crops as coffee, bananas, yams, taniers, and plantains. Some small areas are in sugarcane and citrus fruits. Erosion is a major management concern. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, liming and fertilizing, and controlling weeds are the main pasture management concerns.

This soil is well suited for Honduras pine, Honduras mahogany, eucalyptus, kadam, and mahoe. Slope limits the use of equipment, and the soil is slippery when wet. Controlling weeds, hand planting, and fertilizing help to improve the survival rate of seedlings.

The clayey texture and low strength are the main limitations of the soil for nonfarm development.

The capability subIcass is IIIe.

VoD2—Voladora clay, 12 to 20 percent slopes, eroded. This soil is deep, moderately steep, and well drained. It is on the side slopes and ridgetops of humid volcanic uplands. Slopes range from 100 to 300 feet long. The areas of the soil range from 10 to 25 acres.

Typically, the surface layer is dark reddish brown, firm clay about 8 inches thick. The subsoil is red, firm clay 25 inches thick. The substratum is multicolored clay loam saprolite to a depth of 50 inches or more.

Included with this soil in mapping are small areas of Daguey and Humatas soils that make up 5 to 10 percent of the unit.

The permeability of this Voladora soil is moderate. The available water capacity is high. Runoff and natural fertility are medium. Reaction is strongly acid in the surface layer and extremely acid in the lower layers.

This soil is used mainly for coffee, bananas, yams, and taniers. Some small areas are in citrus fruits and sugarcane. Slope and an erosion hazard are the main limitations for crops. Crops respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass, stargrass, and merkergrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

This soil is well suited for Honduras pine, Honduras mahogany, robusta eucalyptus, kadam, and mahoe. Slope limits the use of equipment, and the soil is slippery when wet.

Slope and low strength are the main limitations of the soil for nonfarm development.

The capability subclass is IVe.

VoE2—Voladora clay, 20 to 40 percent slopes, eroded. This soil is deep, steep, and well drained. It is on the ridgetops and side slopes of volcanic uplands. Slopes are 100 to 200 feet long. The areas of the soil range from 10 to 50 acres.

Typically, the surface layer is dark reddish brown, firm clay about 8 inches thick. The subsoil is red, firm clay 25 inches thick. The substratum is multicolored clay loam saprolite to a depth of 50 inches or more.

Included with this soil in mapping are small areas of Humatas soils and areas of severely eroded soils where the subsoil is exposed at the surface. Included soils make up 5 to 10 percent of the unit.

The permeability of this Voladora soil is moderate. The available water capacity is high. Runoff is rapid. Natural fertility is medium. Reaction is strongly acid in the surface layer and extremely acid in the lower layers.

This soil is mainly used for shade-grown coffee. Some areas are used for food crops such as plantains, taniers, yams, bananas, and citrus fruits. Slope and an erosion hazard are the main limitations. Crops on this soil respond well to applications of lime and fertilizer.

The soil is well suited for such pasture plants as pangolagrass and stargrass. Using proper stocking rates and deferred grazing, controlling weeds, and liming and fertilizing are the main pasture management concerns.

Slope and a high rate of seedling mortality are the main limitations for woodland. Controlling brush, hand planting, and fertilizing help to reduce the rate of seedling mortality.

Slope and low strength are the main limitations of the soil for nonfarm development.

The capability subclass is VIe.

prime farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in providing short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when it is treated and managed using acceptable farming methods. Prime farmland produces high yields with moderate inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, or other land, but not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has favorable temperature and growing season and acceptable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not flooded during the growing season. The slope ranges mainly from 0 to 12 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 64,500 acres, or nearly 16 percent, of the Arecibo Area meets the soil requirements for prime farmland. Most of the areas are throughout the northern coastal plains and on the alluvial flood plains, mainly in map units 3, 4, and 6 of the general soil map. Most the acreage of this prime farmland is used for crops and pasture. Among the most common crops grown on this prime farmland are sugarcane, plantains, pineapples, sweet potatoes, and taniers. Improved pastures of pangolagrass, merkergrass, and guineagrass are used for dairy and beef cattle.

A recent trend in land use in some parts of the survey area has been the loss of some prime farmlands to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and difficult to cultivate and are usually less productive.

Soil map units that make up prime farmland in the Arecibo Area are listed in this section. This list does not constitute a recommendation for a particular land use. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

Soils that have limitations such as high water table and flooding may qualify for prime farmland if these limitations are overcome by such measures as drainage and flood control. In the following list, the measures needed, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to see if these limitations have been overcome by corrective measures.

The map units that meet the soil requirements for prime farmland are:

AaC—Aceitunas sandy clay loam, 5 to 12 percent slopes
AcC—Aceitunas clay, 5 to 12 percent slopes
AlB—Almirante sandy loam, 2 to 5 percent slopes
AmB—Almirante sandy clay loam, 2 to 5 percent slopes
AmC—Almirante sandy clay loam, 5 to 12 percent slopes
AnB—Almirante clay, 2 to 5 percent slopes
AnC—Almirante clay, 5 to 12 percent slopes
BcB—Bayamon sandy loam, 2 to 5 percent slopes
BsB—Bayamon sandy clay loam, 2 to 5 percent slopes
BsC—Bayamon sandy clay loam, 5 to 12 percent slopes
ByB—Bayamon clay, 2 to 5 percent slopes
ByC—Bayamon clay, 5 to 12 percent slopes
Cn—Coloso silty clay (if drained)
CrC—Corozal clay, 5 to 12 percent slopes
CtB—Coto clay, 2 to 5 percent slopes
CtC—Coto clay, 5 to 12 percent slopes
EaB—Espinosa sandy loam, 2 to 5 percent slopes
EbB—Espinosa sandy clay loam, 2 to 5 percent slopes
EbC—Espinosa sandy clay loam, 5 to 12 percent slopes
EcB—Espinosa clay, 2 to 5 percent slopes
EcC—Espinosa clay, 5 to 12 percent slopes
IsC—Islote sandy clay loam, 2 to 12 percent slopes
MnB—Matanzas clay, 2 to 5 percent slopes
MoC2—Moca clay, 2 to 12 percent slopes, eroded
SnC—Santa Clara clay, 2 to 12 percent slopes
To—Toa silty clay loam (if protected from flooding)
VaB—Vega Alta sandy clay loam, 2 to 5 percent slopes

VaC2—Vega Alta sandy clay loam, 5 to 12 percent slopes, eroded
VcB—Vega Alta clay, 2 to 5 percent slopes
VcC2—Vega Alta clay, 5 to 12 percent slopes, eroded
VeB—Vega Baja clay, 2 to 5 percent slopes (if drained)
Vm—Vivi loam (if protected from flooding)
VoC2—Voladora clay, 5 to 12 percent slopes, eroded

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

According to the Census of Agriculture of 1974, 59,000 acres in the Arecibo Area was used for crops and 113,000 acres for pasture. An increase in the use of improved pasture on the northern coastal plains has resulted in a decrease of land used for sugarcane, coffee, and tobacco; between 1969 and 1974, the acreage used for sugarcane was reduced by 50 percent.

The soils of the coastal plains are moderate in natural fertility. They are deep, well drained, and very strongly acid and range from loamy to clayey. They respond well to applications of fertilizer and lime. The Aceitunas, Almirante, Bayamon, Carrizales, Espinosa, Guerrero, Islote, Rio Lajas, and Vega Alta soils are the major coastal-plain soils. Pineapples, an important fruit crop in the Arecibo Area, are grown on the Bayamon, Almirante, Vega Alta, and Espinosa soils. Erosion is the major limitation of the soils on the coastal plains used for crops and pasture. Contour cropping and using terraces and grassed waterways are practices that reduce runoff and increase infiltration. Application of organic residues and the use of supplemental irrigation during prolonged periods of drought (January to March) are also suitable management practices.

The soils of the flood plains, such as Toa, Vivi, Bajura, Coloso, and Vega Baja soils, are the most fertile in the survey area. They are normally used for sugarcane and pasture. Poor drainage and susceptibility to flooding are the main limitations of these soils for farming, but cultivation of rice is underway on the somewhat poorly drained Coloso soils and poorly drained Bajura soils.

The organic soils of the Cano Tiburones area, such as the Tiburones, Vigia, Palmar, and Garrochales soils, are characterized by a high water table. Most are artificially drained and used for agriculture, mainly pasture. Some areas are in sugarcane.

Most of the soils of the limestone belt, including the Colinas, Soller, San Sebastian, Naranjo, Juncal, San German, and Tanama soils, are used for pasture and food crops. Minimum tillage, contour cropping, and using crop residue help to reduce erosion and increase the fertility and infiltration of the soils.

The humid uplands consist mainly of Daguey, Consumo, Humatas, Consejo, Alonso, Ingenio, Lirios, Adjuntas, and Voladora soils that are steep, well drained, strongly acid, and susceptible to erosion. However, the Mucara, Caguabo, and Morado soils in this area are slightly acid to neutral, shallower to rock, and higher in plant nutrients. Most of the soils in this area are used for shade- and sun-grown coffee, bananas, oranges, food crops, pasture, and woodland. Diversions and hillside ditches and terraces, minimum tillage, and maintaining permanent vegetation help to reduce runoff and erosion in this area.

In general, the main crops suitable for the soils of the Arecibo Area are sun- and shade-grown coffee, sugarcane, plantains, bananas, yams, taniers, sweet potatoes, tobacco, pineapples, oranges, and grapefruits. Such vegetables as tomatoes, peppers, cabbage, and lettuce are grown in some areas, and some areas are in ornamental plants.

Such grasses as stargrass, guineagrass, pangolagrass, and merkergrass are used for improved pasture for dairy and beef cattle. Using proper grazing and stocking rates, liming and fertilizing, and controlling weeds help to maintain a good stand and reduce soil erosion.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in tables 5 and 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby areas and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in tables 5 and 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of Puerto Rico, shows that the chief limitation is climate that is very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed soil map units."

woodland management and productivity

According to the 1974 Census of Agriculture, woodland covers about 24,710 acres in the Arecibo Area. Two natural forests, the Cambalache (921 acres) in the limestone hills and the Rio Abajo (5,607 acres) between the Dos Bocas Lake and the Tanama River, produce timber and are used as recreational areas and as wildlife habitat. The tree species that are most commonly planted are Honduras pine, Honduras mahogany, mahoe, teak, kadam, and robusta eucalyptus.

Table 8 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 8, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as average yearly growth per acre in board feet. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

recreation

The soils of the survey area are rated in table 9 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design,

intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, and local roads and streets. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning,

design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings and dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

sanitary facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level

of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 12, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are

given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected

by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and

organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. Only saturated zones within a depth of about 6 feet are indicated. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard

or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*4*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 17, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Humult (*Hum*, meaning humus, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Tropohumults (*Tropo*, meaning tropical, plus *Humults*, the suborder of the Ultisols that have high humus content).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Tropohumults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, kaolinitic, isohyperthermic Typic Tropohumults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

formation of the soils

This section gives the five major factors of soil formation and describes how these factors have affected the soils in the Arecibo Area.

factors of soil formation

Soils are formed by the action of soil-forming processes on material deposited or accumulated by geologic forces. The characteristics of the soil at any given point are determined by (1) the physical and mineralogical composition of the parent material; (2) the climate under which the material has existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of soil formation have acted on the soil material.

Climate and plant and animal life are active factors of soil genesis. They act on the parent material that has accumulated through the weathering of rocks and slowly change it to a natural body that has genetically related horizons. The effects of the climate and plant and animal life are conditioned by relief. The parent material also affects the kind of soil profile that can be formed and, in extreme cases, determines it almost entirely. Finally, time is needed for the changing of the parent material into a mature soil. The amount of time can be short or long, but some time is always required for the formation of soil horizons. Usually, a long time is required for distinct horizons to develop.

The factors of soil formation are so closely interrelated in their effects on the soil that few generalizations can

be made about the effect on any one unless conditions are specified for the other four.

parent material

Parent material is the unconsolidated mass in which a soil forms. It determines the mineralogical composition of the soil and influences the rate at which a soil forms. The parent material is altered as horizons develop. The rate at which rock weathers and the fragments that are produced through weathering are affected by the composition and structure of the rocks and have a great influence on the kind of soil that forms. In the Arecibo Area, for example, most of the soils have formed in place from weathered volcanic rock or limestone. Other soils in the survey area formed in sediment that was derived from weathered volcanic rock or limestone.

climate

Climate, especially temperature and precipitation, governs the rate of weathering of rocks and the decomposition of minerals. Climate is probably the most influential factor in soil formation. Temperature has a great influence on the rate at which the chemical and physical processes affect profile development. Climate directly affects the accumulation of soil parent material and the differentiation of horizons. It also largely determines the kinds of plants and animals that live in an area.

plants and animals

All living organisms, including vegetation, animals, bacteria, and fungi, are important in soil formation. Vegetation generally determines the amount of organic matter and nutrients in the soil and the color of the surface layer. Living organisms mainly affect horizon differentiation. Animals such as earthworms and ants help to keep the soil open and porous. Bacteria and fungi decompose vegetation and thus release nutrients for plants. Man has affected the surface and subsurface layers of the soils by clearing and plowing the land, fertilizing, mixing horizons, and accelerating the rate of erosion.

relief

Relief, or topography, influences soil formation through its effect on runoff and drainage. Runoff generally is rapid on mountainsides and slow on level plains. In sloping areas where runoff is medium to very rapid, the soils generally are well drained, have a bright colored and unmottled subsoil, and are leached to a greater depth than the wetter soils in the same area, for example, the Humatas and Consumo soils. In the more gently sloping areas where runoff is slower, the soils generally are wet for a short period and have mottles in the subsoil; the Corozal soils are an example. In level areas or slight depressions where the water table is at or near the surface for a long period, the soils have greater evidence of wetness; the Coloso and Jareales soils are examples. The permeability of a soil and the length, steepness, and shape of slopes influence the kind of soil that is formed. Local differences in soils mainly are the result of differences in parent material and relief.

time

Time is required to change parent material into a soil. The length of time necessary is determined by the kind of parent material and by the condition of this material. For example, a very long time is needed for a soil to develop from freshly exposed hard limestone because limestone dissolves slowly. Millions of years may be required for this kind of rock to weather and for a soil to form.

The soils that formed on low bottoms are subject to varying degrees of flooding and can receive new deposits of sediment each time they are flooded. These soils have weak soil structure and weak differences in color between their horizons; Toa soils are an example. Soils that have well developed horizons, such as Humatas soils, have been developing for a longer period than Toa soils.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*3*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*4*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Aceitunas series

The soils of the Aceitunas series are clayey, oxidic, isohyperthermic Typic Palehumults. They are deep and well drained and are on the coastal plains and uplands. They formed in fine textured sediments transported from surrounding hills. The Aceitunas soils are mostly used for sugarcane and pasture. Some areas are in food crops and vegetables. Slopes range from 5 to 12 percent.

Aceitunas soils are associated with Coto, Espinosa, and Almirante soils and are near areas of Rock outcrop. The Aceitunas soils have an argillic horizon that is not

typical of the Coto soils and are more red. The Aceitunas soils are more red than the Espinosa soils and have a higher organic matter content. The Aceitunas soils are not underlain by plinthite, as are the Almirante soils.

Typical pedon of Aceitunas clay, 5 to 12 percent slopes, 1.26 kilometers southeast of kilometer marker 0.1 of Highway 484, in a pasture:

Ap—0 to 6 inches, dark reddish brown (5YR 3/4) clay; moderate fine granular structure; firm, slightly sticky, plastic; many fine roots; few fine black concretions; many fine quartz grains; very strongly acid; clear smooth boundary.

B21t—6 to 13 inches, yellowish red (5YR 4/6) clay; moderate fine subangular blocky structure; firm, slightly sticky, plastic; common fine roots; many black stains from root decay; thin patchy clay films; few fine black concretions; many fine quartz grains; very strongly acid; clear smooth boundary.

B22t—13 to 22 inches, red (2.5YR 4/6) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; few fine black concretions; common black stains from root decay; very strongly acid; gradual smooth boundary.

B23t—22 to 35 inches, red (2.5YR 4/6) clay; weak fine and medium subangular blocky structure; friable, slightly sticky, plastic; few fine roots; thin discontinuous clay films; few fine black concretions; common fine quartz grains; strongly acid; gradual wavy boundary.

B24t—35 to 52 inches, red (2.5YR 4/6) clay; weak fine subangular blocky structure; friable, slightly sticky, plastic; thin discontinuous clay films; shiny ped surfaces; many fine black concretions; strongly acid; gradual wavy boundary.

B25t—52 to 65 inches, yellowish red (5YR 4/8) clay; weak fine subangular blocky structure; very friable, slightly sticky, plastic; thin discontinuous clay films; strongly acid.

The thickness of the solum is more than 60 inches. Reaction is very strongly acid or strongly acid throughout.

The Ap horizon has hue of 5YR, value of 2 and 3, and chroma of 2 to 4. It is clay or sandy clay loam.

The B2t horizon has hue of 5YR and 2.5YR, value of 4, and chroma of 6 to 8. Structure ranges from weak fine and medium to moderate fine and medium subangular blocky. Clay films range from thin patchy to thin discontinuous.

Adjuntas series

The soils of the Adjuntas series are fine, kaolintic, isohyperthermic Typic Humitropepts. They are moderately deep and well drained and are on the humid uplands. They formed in the residuum of highly weathered volcanic rock with a high content of quartz. The Adjuntas soils are mainly in brush and pasture. Slopes range from 40 to 60 percent.

Adjuntas soils are associated with Humatas, Consumo, and Consejo soils. The Adjuntas soils are more brown and have a less developed B horizon than the Humatas or Consumo soils. The Adjuntas soils are deeper than the Consumo soils, are shallower than the Consejos soils, and do not have the argillic horizon typical of the Consejos soils.

Typical pedon of Adjuntas clay, 40 to 60 percent slopes, eroded, 320 meters east of a school at the end of Highway 602, in a field:

Ap—0 to 5 inches, dark brown (10YR 3/3) clay; moderate fine and medium granular structure; firm, slightly sticky, plastic; many fine roots; many fine pores; 3 percent 1/4 to 1/2 inch volcanic fragments; few fine quartz grains; very strongly acid; clear smooth boundary.

B1—5 to 10 inches, dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6) clay; weak fine subangular blocky structure; firm, slightly sticky, plastic; common fine roots; many fine pores; few patchy clay films; 3 percent 1/2 to 1 inch volcanic fragments; very strongly acid; clear smooth boundary.

B2—10 to 17 inches, strong brown (7.5YR 5/6) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; many fine pores; 3 percent 1/4 to 1 inch volcanic fragments; few fine quartz grains; very strongly acid; clear wavy boundary.

B3—17 to 24 inches, mixed yellow (10YR 7/6), white (10YR 8/2), and brownish yellow (10YR 6/8), clay; common fine prominent red mottles; weak medium subangular blocky structure; friable, slightly sticky, plastic; few fine roots; many fine pores; many quartz grains; 25 percent saprolite; very strongly acid; clear wavy boundary.

Cr—24 to 48 inches, partially weathered volcanic rock.

R—48 inches, semiconsolidated volcanic rock.

The thickness of the solum and depth to partially weathered rock range from 20 to 30 inches. Reaction is very strongly acid or extremely acid.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4.

The B2 horizon has hue of 10YR and 7.5YR, value of 4 or 5, and chroma of 4 to 8. The B3 horizon has hue of 10YR, value of 6 to 8, and chroma of 2 to 8. Structure of the B horizon is weak fine or medium subangular blocky.

Algarrobo series

The soils of the Algarrobo series are coarse-loamy, siliceous, isohyperthermic Entic Haplohumods. They are

deep and excessively drained and are on coastal plains. They formed in coarse textured sediments with a high content of quartz and are over coastal plain clays. The Algarrobo soils are in pangolagrass, native pasture, coconuts, and brush. Slopes range from 2 to 12 percent.

Algarrobo soils are associated with Corozo, Jobos, Guerrero, Arecibo, and Carrizales soils. The Corozo soils have less organic matter than the Algarrobo soils, and the Jobos and Guerrero soils have no organic matter but have plinthite. The Arecibo soils do not have organic matter within a depth of 50 inches, and the Carrizales soils are not as gray as the Algarrobo soils and have no organic matter.

Typical pedon of Algarrobo fine sand, 2 to 12 percent slopes, 3 meters northeast of Highway 668, 200 meters from kilometer 42.9 of Highway 2, in a palm tree field:

A1—0 to 11 inches, gray (10YR 5/1) fine sand; single grain; loose, very friable, nonsticky, nonplastic; many fine and medium roots; 15 percent black (10YR 2/1) rounded and elongated friable organic matter accumulations 1/4 inch thick; extremely acid; abrupt smooth boundary.

A2—11 to 32 inches, light gray (10YR 7/1) fine sand; single grain; very friable, nonsticky, nonplastic; common medium roots; extremely acid; clear wavy boundary.

Bh1—32 to 37 inches, black (10YR 2/1), dark brown (10YR 3/3), and very dark brown (10YR 2/2) stratified sandy loam; single grain; very friable, nonsticky, nonplastic; few medium roots; extremely acid; abrupt wavy boundary.

IIB2—37 to 50 inches, mixed light gray (10YR 7/1), brown (7.5YR 5/2), and strong brown (7.5YR 5/8) clay; weak coarse subangular blocky structure; extremely firm, slightly sticky, plastic; very dark gray (10YR 3/1) along root channels; very strongly acid; clear wavy boundary.

IIC1—50 to 68 inches, mixed gray (10YR 7/1) and brown (7.5YR 5/2) clay; massive; extremely firm, slightly sticky, plastic; very strongly acid; clear wavy boundary.

IIC2—68 to 80 inches, light gray (10YR 7/1) sandy clay loam; massive; very firm, slightly sticky, plastic; very strongly acid.

The depth to the accumulation of illuvial organic matter ranges from 30 to 50 inches. Reaction ranges from strongly acid to extremely acid throughout.

The A1 horizon has hue of 10YR, value of 5 or 6, and chroma of 1.

The A2 horizon has hue of 10YR, value of 7 or 8, and chroma of 1.

The Bh horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. It ranges from sandy loam to loamy sand.

The B2 horizon has hue of 10YR and 7.5YR, value of 5 to 7, and chroma of 1 to 8. It ranges from sandy clay to clay. Structure is weak moderate or weak coarse subangular blocky.

Almirante series

The soils of the Almirante series are clayey, oxidic, isohyperthermic Plinthic Paleudults. They are deep and well drained and are on the coastal plains. They formed in fine textured materials of mixed origin. The Almirante soils are mostly used for sugarcane, pangolagrass, food crops, pineapples, and native pasture. Slope ranges from 2 to 12 percent.

Almirante soils are associated with Espinosa, Vega Alta, and Bayamon soils. The Almirante soils have underlying plinthite layers that are not typical of the Espinosa or Bayamon soils, are deeper to plinthite than the Vega Alta soils, and are more yellow than the Bayamon soils.

Typical pedon of Almirante clay, 2 to 5 percent slopes, 320 meters north of kilometer marker 4.0 of Highway 160, in a pineapple field:

Ap1—0 to 6 inches, dark yellowish brown (10YR 4/4) clay; weak fine subangular blocky structure parting to weak fine granular; firm, slightly sticky, plastic; many fine roots; very strongly acid; clear smooth boundary.

B21t—6 to 19 inches, brownish yellow (10YR 6/8) and dark yellowish brown (10YR 4/4) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; many fine pores; thin patchy clay films; few fine black concretions; common fine quartz grains; very strongly acid; clear smooth boundary.

B22t—19 to 28 inches, brownish yellow (10YR 6/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; many fine pores; thin patchy clay films; few fine black concretions; common fine quartz grains; very strongly acid; clear wavy boundary.

B23t—28 to 32 inches, red (2.5YR 4/6) clay; weak fine subangular blocky structure; firm, slightly sticky, plastic; few fine roots; many fine pores; thin patchy clay films; few fine black concretions; common fine quartz grains; very strongly acid; clear wavy boundary.

B24t—32 to 45 inches, yellowish brown (10YR 5/8) and red (2.5YR 4/6) clay; weak fine subangular blocky structure; firm, slightly sticky, plastic; thin patchy clay films; few fine quartz grains; 15 to 18 percent plinthite; very strongly acid; diffuse wavy boundary.

B25t—45 to 60 inches, mixed red (2.5YR 5/6), yellowish brown (10YR 5/8), yellow (10YR 7/6), and yellowish red (5YR 4/6) clay; weak fine subangular blocky structure; firm, slightly sticky, plastic; thin patchy clay films; few fine quartz grains; 20 to 25 percent plinthite; very strongly acid.

The argillic horizon is thicker than 60 inches. The depth to plinthite ranges from 20 to 60 inches. Reaction of the profile is strongly acid or very strongly acid.

The Ap horizon has hue of 10YR through 5YR and value and chroma of 3 or 4. It ranges from sandy loam to clay.

The upper part of the B horizon has hue of 10YR and 7.5YR, value of 4 to 6, and chroma of 4 to 8. The structure ranges from moderate fine to moderate medium subangular blocky. Clay films range from thin patchy to none. The lower part of the B horizon consists of variegated red, yellowish brown, and yellow. Structure ranges from weak fine to moderate medium subangular blocky. The B horizon ranges from 7 to 25 percent plinthite, by volume.

Alonso series

The soils of the Alonso series are clayey, oxidic, isohyperthermic Orthoxic Tropohumults. They are deep and well drained and are on the humid uplands. They formed in fine textured residuum weathered from basic volcanic rocks. The Alonso soils mostly are used for coffee, food crops, and pasture. Slopes range from 12 to 60 percent.

Alonso soils are associated with Humatas, Daguey, Consumo, and Morado soils. The Alonso soils have a thinner solum than the Daguey soils and a thicker solum than the Consumo or Morado soils. The Alonso soils have lower chroma than the Daguey or Humatas soils, have a lower cation exchange capacity than the Humatas soils, have a thicker argillic horizon than the Consumo soils, and are finer textured than the Morado soils.

Typical pedon of Alonso clay, 12 to 20 percent slopes, eroded, 20 meters west of kilometer marker 0.55 of Highway 608, in a stargrass field:

Ap—0 to 7 inches, dark reddish brown (5YR 3/3) clay; weak fine subangular blocky structure; friable, slightly sticky, plastic; many fine roots; common fine volcanic fragments; very strongly acid; clear smooth boundary.

B21t—7 to 13 inches, reddish brown (5YR 4/3) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; very strongly acid; clear smooth boundary.

B22t—13 to 23 inches, reddish brown (10YR 4/4) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin continuous clay films; very strongly acid; gradual wavy boundary.

B23t—23 to 30 inches, dark reddish brown (5YR 3/3) and reddish brown (5YR 4/3) clay; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; thin patchy clay films; very strongly acid; gradual wavy boundary.

B3—30 to 45 inches, mixed dark reddish brown (5YR 3/3), reddish brown (5YR 4/3), and yellowish red (5YR 5/6) clay; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few patchy clay films; 25 percent saprolite; very strongly acid; gradual wavy boundary.

C1—45 to 60 inches, variegated dark reddish brown (5YR 3/4), weak red (10YR 4/3), light gray (5YR 7/1), dark gray (5YR 4/1), and strong brown (7.5YR 5/6), saprolite that crushes to clay loam; massive; very friable, slightly sticky, slightly plastic; very strongly acid.

The thickness of the solum ranges from 41 to 55 inches.

The A horizon has hue of 5YR or 2.5YR, value of 3, and chroma of 2 or 3.

The B2t horizon has hue of 2.5YR to 10R, value of 3 or 4, and chroma of 2 to 4. Structure is weak or moderate and fine or medium subangular blocky. Clay films range from thin patchy to thin discontinuous.

Arecibo series

The soils of the Arecibo series are sandy, siliceous, isohyperthermic Grossarenic Entic Haplohumods. They are deep and excessively drained and are on coastal plains. They formed in quartzitic sands. Arecibo soils mainly are used for pangolagrass, coconuts, and native pasture. Slopes range from 2 to 12 percent.

Arecibo soils are associated with Jobos, Corozo, Algarrobo, Guerrero, and Carrizales soils. The Arecibo soils do not have the plinthite layers typical of the Jobos and Guerrero soils and are deeper to illuvial organic matter than the Algarrobo soils. The Carrizales soils are not as yellow as the Arecibo soils and do not have the accumulation of illuvial organic matter. The Arecibo soils have thicker sandy layers than the Corozo soils but do not have the argillic horizon typical of the Corozo soils.

Typical pedon of Arecibo fine sand, 2 to 12 percent slopes, 600 meters west of kilometer marker 15.2 of Highway 686, in a pangolagrass field:

A11—0 to 6 inches, gray (10YR 5/1) fine sand; single grain; loose, nonsticky, nonplastic; many fine roots; 25 percent black (10YR 2/1) rounded friable organic matter accumulations 1/4 inch thick; very strongly acid; clear smooth boundary.

A12—6 to 12 inches, gray (10YR 5/1 and 6/1) fine sand; single grain; loose, nonsticky, nonplastic; common fine roots; 15 percent black (10YR 2/1) rounded friable organic matter accumulations 1/4 inch thick; very strongly acid; clear wavy boundary.

A21—12 to 20 inches, light gray (10YR 7/1) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; very strongly acid; clear wavy boundary.

A22—20 to 40 inches, white (10YR 8/1) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; very strongly acid; diffuse wavy boundary.
A23—40 to 59 inches, white (10YR 8/1) and brown (10YR 5/3) fine sand; single grain, loose, nonsticky, nonplastic; decayed roots; very strongly acid; clear wavy boundary.
B1—59 to 68 inches, brown (10YR 5/3) fine sand; single grain; loose, nonsticky, nonplastic; very strongly acid; abrupt wavy boundary.
B21h—68 to 74 inches, black (10YR 2/1), very dark grayish brown (10YR 3/2), and very dark brown (10YR 2/2) stratified sand; single grain; loose, nonsticky, nonplastic; very strongly acid; clear wavy boundary.
B22h—74 to 82 inches, yellowish brown (10YR 5/6) loamy sand; single grain; loose, nonsticky, nonplastic; 15 percent black (10YR 2/1) wavy lamellae 1 to 3 centimeters thick and 8 centimers apart; very strongly acid; clear wavy boundary.
IIC1—82 to 88 inches, mixed very pale brown (10YR 8/4), white (10YR 8/1), brown (10YR 5/3), and reddish yellow (7.5YR 6/8) sandy loam; massive; firm, slightly sticky, slightly plastic; few tongues from Bh horizon; very strongly acid; gradual wavy boundary.
IIC2—88 to 91 inches, very pale brown (10YR 8/4), white (10YR 8/1), brown (10YR 5/3), and reddish yellow (7.5YR 6/8) sandy loam; massive; firm, slightly sticky, slightly plastic; very strongly acid; clear wavy boundary.
IIIC3—91 to 113 inches, white (5Y 8/1) and light gray (5Y 7/2) sandy loam; single grain; loose, nonsticky, nonplastic; very strongly acid.

The thickness of the solum is more than 80 inches. The depth to the horizons with illuvial organic matter ranges from 51 to 75 inches. Reaction is very strongly acid to extremely acid throughout.

The A horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 10YR, value of 2 to 5, and chroma of 1 to 8. It is mottled in some pedons.

The IIC horizon has hue of 10YR, value of 4 to 8, and chroma of 1 to 8. It is sandy loam or loamy sand.

Bajura series

The soils of the Bajura series are fine, mixed, nonacid, isohyperthermic Vertic Tropaquepts. They are deep and poorly drained and are on flood plains. They formed in fine textured alluvial sediments of mixed origin. Bajura soils are mostly used for sugarcane and pasture. Slopes range from 0 to 2 percent.

The Bajura soils are associated with Coloso, Vega Baja, and Toa soils. The Bajura soils are more poorly drained than any of the associated soils. The Bajura soils have pressure faces, which are not typical in the Coloso soils; do not have the argillic horizon typical of the Vega Baja soils; and are finer textured than the Toa soils.

Typical pedon of Bajura clay, 800 meters west of Highway 616, 5.7 kilometers south of kilometer marker 0.0 of Highway 685:

Ap—0 to 7 inches, very dark grayish brown (10YR 3/2) clay; common fine distinct dark yellowish brown (10YR 3/4) mottles; weak fine and medium subangular blocky structure; very firm, slightly sticky, plastic; many fine roots; few pressure faces; slightly acid; gradual smooth boundary.
B2—7 to 15 inches, black (10YR 2/1) clay; common fine distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 3/4) mottles; weak medium and coarse subangular blocky structure; very firm, slightly sticky, plastic; common fine roots; common pressure faces; neutral; gradual smooth boundary.
C1g—15 to 37 inches, mixed gray (10YR 5/1), yellowish brown (10YR 5/6), and dark yellowish brown (10YR 4/4) clay; massive; firm, slightly sticky, plastic; few fine roots; common pressure faces; neutral; clear wavy boundary.
C2g—37 to 60 inches, mixed gray (2.5Y 6/0), dark yellowish brown (10YR 4/4), and yellowish brown (10YR 5/8) clay; massive, firm, slightly sticky, plastic; few fine roots; neutral.

The thickness of the solum ranges from 13 to 16 inches. Reaction is slightly acid or neutral. Pressure faces are few or common.

The A horizon has hue of 10YR or 2.5Y, value of 2 or 3, and chroma of 1 or 2.

The B horizon has hue of 2.5Y, value of 2 to 6, and chroma of 0 to 2. Mottles are common or many.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 0 or 1.

Bayamon series

The soils of the Bayamon series are clayey, oxidic, isohyperthermic Typic Haplorthox. They are deep and well drained and are on uplands and coastal plains. They formed in fine textured sediments of mixed origin. The Bayamon soils are mostly used for sugarcane, pineapples, food crops, and pasture. Slopes range from 2 to 12 percent.

Bayamon soils are associated with Vega Alta, Almirante, Espinosa, and Tanama soils. The Bayamon soils do not have the plinthite layers typical of the Vega Alta and Almirante soils, are redder than and do not have the argillic horizon typical of the Espinosa soils, and are deeper and have lower base saturation than the Tanama soils.

Typical pedon of Bayamon clay, 2 to 5 percent slopes, 50 meters north of kilometer marker 2.75 of Highway 670, in a pineapple field:

Ap1—0 to 5 inches, dark reddish brown (5YR 3/3) clay; weak fine subangular blocky structure parting to moderate fine granular; friable, slightly sticky, slightly plastic; many fine roots; many fine quartz grains; very strongly acid; clear smooth boundary.
Ap2—5 to 11 inches, dark reddish brown (5YR 3/4) and red (2.5YR 4/6) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; many fine quartz grains; very strongly acid; abrupt smooth boundary.
B21—11 to 19 inches, red (2.5YR 4/6) clay; weak fine and medium subangular blocky structure; friable, slightly sticky, plastic; few fine roots; common fine pores; shiny ped faces; many fine quartz grains; few fine black concretions; black stains along root channels; very strongly acid; gradual wavy boundary.
B22—19 to 33 inches, red (2.5YR 4/6) clay; weak fine subangular blocky structure; friable, slightly sticky, plastic; common fine pores; common fine quartz grains; few fine black concretions; black stains along root channels; very strongly acid; gradual wavy boundary.
B23—33 to 46 inches, dark red (2.5YR 3/6) clay; weak fine subangular blocky structure; very friable, slightly sticky, slightly plastic; common fine pores; many fine quartz grains; few fine black concretions; black coating along ped faces; very strongly acid; gradual wavy boundary.
B24—46 to 60 inches, dark red (2.5YR 3/6) clay; moderate fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine pores; common fine quartz grains; very strongly acid; clear wavy boundary.
B25—60 to 65 inches, dark red (2.5YR 3/6) clay; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure parting to moderate fine angular and subangular blocky; firm, slightly sticky, slightly plastic; few fine black concretions; common fine pores; common fine quartz grains; very strongly acid.

The thickness of the solum is more than 60 inches. Reaction of the soil is strongly acid or very strongly acid. Quartz grains range from common to many.

The A horizon has hue of 5YR through 10R and value and chroma of 3 or 4. It ranges from sandy loam to clay.

The B2 horizon has hue of 2.5YR or 10R, value of 3 or 4, and chroma of 4 to 8. The structure is weak fine to coarse subangular blocky or weak and moderate fine and very fine angular blocky. The horizon is slightly plastic or plastic.

Caguabo series

The soils of the Caguabo series are loamy-skeletal, mixed, isohyperthermic Lithic Eutropepts. They are shallow and well drained and are on uplands. They formed in moderately fine textured residuum weathered from volcanic rocks. The Caguabo soils are mostly used for pasture. A few areas are wooded. Slopes range from 20 to 60 percent.

Caguabo soils are associated with Mucara, Morado, and Maraguez soils. The Caguabo soils are shallower than any of the associated soils, are coarser textured than the Mucara soils, and are finer textured in the lower part than the Maraguez soils.

Typical pedon of Caguabo clay loam, 20 to 60 percent slopes, 15 meters north of a dirt road that is 1.6 kilometers east of kilometer marker 17.7 of Highway 149:

Ap—0 to 6 inches, dark brown (10YR 4/3) clay loam; moderate fine granular; friable, slightly sticky, slightly plastic; many fine roots; 10 percent fine and medium volcanic fragments; slightly acid; clear smooth boundary.
B2—6 to 13 inches, dark yellowish brown (10YR 4/4) gravelly clay loam; weak fine subangular blocky structure parting to weak fine granular; friable, slightly sticky, slightly plastic; common fine roots; 40 percent fine and medium gravel; slightly acid; clear smooth boundary.
Cr—13 to 18 inches, highly weathered and partially weathered volcanic rock.
R—18 inches, hard and semiconsolidated volcanic rock.

The thickness of the solum ranges from 10 to 14 inches and the depth to the hard rock from 13 to 19 inches.

The A horizon has hue of 10YR, value of 4, and chroma of 2 or 3. Structure is weak or moderate fine granular.

The B horizon has hue of 10YR, value of 4, and chroma of 3 or 4. It ranges from gravelly clay loam to gravelly silty clay loam. It has weak fine or medium subangular blocky structure parting to granular. The content of volcanic rock fragments ranges from 35 to 50 percent.

Caracoles series

The soils of the Caracoles series are loamy, mixed, isohyperthermic Lithic Ustorthents. They are very shallow and well drained and are on limestone uplands. They formed in medium textured sediments weathered from semiconsolidated calcareous sandstone. The Caracoles soils are mostly used for pasture. A few areas are in brush. Slopes range from 5 to 40 percent.

The Caracoles soils are associated with San German and Islote soils. The Caracoles soils have fewer coarse fragments than the San German soils and are shallower than and do not have the argillic horizon typical of the Islote soils.

Typical pedon of Caracoles loam, 20 to 40 percent slopes, 50 meters south of kilometer marker 6.25 of Highway 681, in a native pasture field:

Ap—0 to 6 inches, very dark grayish brown (10YR 3/2) loam; weak fine granular; friable, nonsticky, slightly plastic; many fine roots; neutral; abrupt wavy boundary.
R—6 inches, semiconsolidated calcareous sandstone.

The depth to the semiconsolidated calcareous sandstone is less than 10 inches. Reaction ranges from neutral to mildly alkaline.

The A horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 2 or 3.

Carrizales series

The soils of the Carrizales series are isohyperthermic, coated Typic Quartzipsamments. They are deep and excessively drained and are on coastal plains. They formed in sandy sediments. The Carrizales soils are used for food crops and pasture. Slopes range from 2 to 12 percent.

Carrizales soils are associated with Jobos, Guerrero, Rio Lajas, Arecibo, Algarrobo, and Corozo soils. The Carrizales soils do not have the plinthite layers typical of the Jobos and Guerrero soils; do not have the argillic horizon typical of the Rio Lajas soils; and do not have the accumulations of illuvial organic matter typical of the Algarrobo, Arecibo, and Corozo soils. The Carrizales soils have more yellow than the Rio Lajas soils.

Typical pedon of Carrizales fine sand, 2 to 12 percent slopes, 650 meters southeast of kilometer marker 87.1 of Highway 2, in a pasture:

A1—0 to 8 inches, dark brown (10YR 3/3) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; strongly acid; abrupt smooth boundary.
C1—8 to 21 inches, brown (7.5YR 5/2) fine sand; single grain; loose, nonsticky, nonplastic; few fine roots; strongly acid; clear smooth boundary.
C2—21 to 32 inches, brown (7.5YR 5/4) fine sand; single grain; loose, nonsticky, nonplastic; very strongly acid; clear smooth boundary.
C3—32 to 50 inches, light brown (10YR 6/4) fine sand; single grain; loose, nonsticky, nonplastic; very strongly acid; clear smooth boundary.
C4—50 to 60 inches, yellow (10YR 7/6) fine sand; single grain; loose, nonsticky, nonplastic; very strongly acid.

Sand throughout the profile consists mostly of coated quartz grains, and the profile is more than 95 percent quartz. Reaction ranges from strongly acid to extremely acid throughout.

The A horizon has hue of 10YR and value and chroma of 3 or 4.

The C horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 2 to 6.

Catano series

The soils of the Catano series are carbonatic, isohyperthermic Typic Tropopsamments. They are deep and excessively drained and are on coastal plains. They formed in coarse, calcareous and volcanic, sand-sized sediments. The Catano soils are mostly used for coconuts and pasture. Some small areas are used for food crops. Slopes range from 0 to 2 percent.

The Catano soils are associated with coastal beaches and Tropopsamments. Coastal beaches are constantly being reworked by wave action and do not support vegetation; Tropopsamments are constantly being reworked by the wind.

Typical pedon of Catano sand, 100 meters north of kilometer marker 9.8 of Highway 681, in a field of pangolagrass:

A1—0 to 5 inches, very dark grayish brown (10YR 3/2) sand; single grain; loose, nonsticky, nonplastic; light gray (10YR 7/2) sand-sized seashells; strong effervescence, moderately alkaline; clear smooth boundary.
AC—5 to 16 inches, dark brown (10YR 4/3) sand and light gray (10YR 7/2) sand-sized seashells; single grain; loose, nonsticky, nonplastic; many fine roots; many fine volcanic fragments; strong effervescence, moderately alkaline; clear smooth boundary.
C1—16 to 24 inches, pale brown (10YR 6/3) sand; single grain; loose, nonsticky, nonplastic; few fine roots; few fine volcanic fragments; strong effervescence, moderately alkaline; clear smooth boundary.
C2—24 to 36 inches, light brownish gray (2.5Y 6/2) sand; single grain; loose, nonsticky, nonplastic; few fine volcanic fragments; strong effervescence, moderately alkaline; clear smooth boundary.
C3—36 to 60 inches, light gray (2.5Y 7/2) sand; single grain; loose, nonsticky, nonplastic; many seashell fragments; strong effervescence, moderately alkaline.

The sandy layers extend to a depth of more than 60 inches. Calcareous seashells, quartz, and volcanic fragments in various proportions make up the sand-size fractions.

The A horizon has hue of 10YR and value and chroma of 2 or 3.

The C horizon has hue of 10YR or 2.5Y, value of 6 to 7, and chroma of 2 or 3.

Colinas series

The soils of the Colinas series are fine-loamy, carbonatic, isohyperthermic Eutropeptic Rendolls. They are moderately deep and well drained and are on uplands. They formed in moderately fine residuum weathered from soft limestone. The Colinas soils are

mostly used for pangolagrass, sugarcane, and native pasture. Some areas are in food crops. Slopes range from 12 to 60 percent.

Colinas soils are associated with Naranjo, Juncal, and Soller soils. The Colinas soils are shallower and coarser textured than the Naranjo or Juncal soils. The Colinas soils are coarser textured and are underlain by softer limestone than the Soller soils.

Typical pedon of Colinas clay loam, 20 to 40 percent slopes, eroded, 320 meters north of kilometer marker 66.5 of Highway 2, in a field of native pasture:

Ap—0 to 8 inches, very dark grayish brown (10YR 3/2) clay loam; weak fine granular structure; firm, slightly sticky, plastic; many fine roots; many fine and medium limestone fragments; violent effervescence; clear smooth boundary.

B—8 to 14 inches, dark brown (10YR 4/3) clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; many fine limestone fragments; violent effervescence; clear smooth boundary.

C1—14 to 21 inches, light yellowish brown (10YR 6/4) clay loam; massive; friable, nonsticky, slightly plastic; common fine limestone fragments and soft limestone; few dark colors due to root decay; violent effervescence; gradual wavy boundary.

C2—21 to 60 inches, soft limestone.

The thickness of the solum ranges from 13 to 19 inches and the depth to the soft limestone from 20 to 29 inches. The profile is calcareous and is 5 to 10 percent by volume limestone fragments 1/4 to 1/.2 inch in diameter.

The Ap horizon has hue of 10YR, value of 3, and chroma of 2 or 3. It is clay loam or cobbly clay loam.

The B horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or more. Structure is weak fine or medium subangular blocky.

Coloso series

The soils of the Coloso series are fine, mixed, nonacid, isohyperthermic Aeric Tropic Fluvaquents. They are deep and somewhat poorly drained and are on flood plains. They formed in fine textured and moderately fine textured alluvial sediments. Slopes range from 0 to 2 percent.

Coloso soils are associated with Toa, Bajura, and Vega Baja soils. The Coloso soils are finer textured and more poorly drained than the Toa soils and are better drained than the Bajura soils. The Coloso soils do not have the pressure faces typical of the Bajura soils or the argillic horizon typical of the Vega Baja soils.

Typical pedon of Coloso silty clay, 100 meters east of Highway 616, 4.8 kilometers north of kilometer marker 2.5 of Highway 685:

Ap—0 to 7 inches, brown (10YR 4/3) silty clay; moderate medium granular structure; firm, slightly sticky, plastic; many fine roots; slightly acid; clear smooth boundary.

B2—7 to 15 inches, brown (10YR 4/3) clay; few fine faint dark gray (10YR 4/1) mottles and common fine faint yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure parting to weak fine subangular blocky; firm, slightly sticky, plastic; many fine roots; few fine black concretions; neutral; gradual smooth boundary.

C1g—15 to 26 inches, mixed dark gray (10YR 4/1) and dark grayish brown (10YR 4/2) clay; few fine faint dark yellowish brown (10YR 4/4) mottles; massive; firm, slightly sticky, plastic; common fine roots; neutral; clear smooth boundary.

C2g—26 to 42 inches, dark gray (10YR 4/1) clay; few fine faint dark yellowish brown (10YR 4/4) mottles; massive; firm, slightly sticky, plastic; common fine roots; neutral; gradual wavy boundary.

C3—42 to 60 inches, gray (10YR 5/1) and dark yellowish brown (10YR 4/4) clay; massive; firm, slightly sticky, plastic; few fine roots; common fine black concretions; neutral.

The thickness of the solum ranges from 10 to 17 inches. Reaction ranges from medium acid to neutral.

The A horizon has hue of 10YR, value of 4, and chroma of 3 or 4.

The B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4 and is mottled. Structure is weak fine or medium subangular blocky.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2 and is mottled. It is silty clay or clay.

Consejo series

The soils of the Consejo series are clayey, mixed, isohyperthermic Typic Tropudults. They are deep and well drained and are on uplands. They formed in fine textured and moderately fine textured residuum weathered from volcanic rocks. The Consejo soils are in coffee, food crops, and pasture. Slopes range from 20 to 60 percent.

Consejo soils are associated with Humatas, Consumo, and Adjuntas soils. The Consejo soils do not have the accumulation of illuvial organic matter typical of the Humatas soils, are more yellow and have a thicker solum than the Consumo soils, and are deeper than and have an argillic horizon not typical of the Adjuntas soils.

Typical pedon of Consejo clay, 20 to 40 percent slopes, 1.1 kilometers south of kilometer marker 12.1 of Highway 605, in a field of merkergrass:

Ap—0 to 5 inches, dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) clay; moderate fine and medium granular structure; firm, slightly sticky,

plastic; many fine roots; few quartz grains; few wormholes; extremely acid; clear smooth boundary.
B21t—5 to 10 inches, dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/8) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; many patchy clay films; few quartz grains; few wormholes; extremely acid; clear smooth boundary.
B22t—10 to 18 inches, yellowish brown (10YR 5/8) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; many patchy clay films; common quartz grains; extremely acid; clear wavy boundary.
B3—18 to 28 inches, yellow (10YR 7/6), brownish yellow (10YR 6/8), and white (10YR 8/2) clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky, plastic; few fine roots; many quartz grains; extremely acid; clear wavy boundary.
C—28 to 60 inches, brownish yellow (10YR 6/8), yellow (10YR 7/6), yellowish brown (10YR 5/6), and white (10YR 8/2) clay loam; massive; friable, slightly sticky, plastic; many quartz grains; extremely acid.

The thickness of the solum ranges from 24 to 42 inches. Reaction ranges from strongly acid to extremely acid.

The A horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 2 to 4.

The B2t horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Clay films range from patchy to discontinuous. The B3 horizon is clay or clay loam. The B horizon has weak or moderate fine or medium subangular blocky structure.

The C horizon ranges from clay loam to loam.

Consumo series

The soils of the Consumo series are clayey, mixed, isohyperthermic Dystropeptic Tropudults. They are deep and well drained and are on uplands. They formed in fine textured and moderately fine textured sediments weathered from basic volcanic rocks. The Consumo soils are mostly used for coffee, pasture, and food crops. Slopes range from 20 to 60 percent.

Consumo soils are associated with Humatas, Daguey, and Morado soils. The Consumo soils have a thinner solum than the Daguey or Humatas soils and are finer textured and deeper than the Morado soils.

Typical pedon of Consumo clay, 40 to 60 percent slopes, 400 meters northwest of kilometer marker 6.1 of Highway 602, in a field of native pasture:

Ap—0 to 6 inches, reddish brown (5YR 4/4) clay; weak fine subangular blocky structure parting to weak fine granular; friable, slightly sticky, plastic; many fine roots; very strongly acid; clear smooth boundary.
B2t—6 to 12 inches, red (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; very strongly acid; clear smooth boundary.
B3—12 to 18 inches, red (2.5YR 4/6) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; 30 percent saprolite; thin patchy clay films; very strongly acid; clear wavy boundary.
C—18 to 50 inches, variegated red (7.5R 4/6, 4/8), strong brown (7.5YR 5/8), black (10YR 2/1) silty clay loam; massive; friable, slightly sticky, plastic; very strongly acid.

The thickness of the solum ranges from 14 to 24 inches.

The A horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6.

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 or 8. It has weak or moderate subangular blocky structure. Clay films range from thin patchy to thin discontinuous.

The C horizon is silty clay loam to clay.

Corozal series

The soils of the Corozal series are clayey, mixed, isohyperthermic Typic Tropohumults. They are deep and somewhat poorly drained and are on uplands. They formed in fine textured and moderately fine textured residuum from volcanic rocks. The Corozal soils are used mainly for pasture. Some areas are in food crops, coffee, and sugarcane. Slopes range from 2 to 12 percent.

The Corozal soils are associated with and are more poorly drained than the Daguey and Humatas soils.

Typical pedon of Corozal clay, 5 to 12 percent slopes, 65 meters southwest of kilometer marker 13.7 of Highway 146, in a field of native pasture:

Ap—0 to 6 inches, reddish brown (5YR 4/4) clay; few fine distinct grayish brown (10YR 5/2) mottles; moderate fine granular structure; friable, slightly sticky, plastic; many fine roots; very strongly acid; clear smooth boundary.
B21t—6 to 13 inches, red (2.5YR 4/6) clay; common medium distinct yellowish brown (10YR 5/4) mottles and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; very strongly acid; clear smooth boundary.
B22t—13 to 22 inches, red (10R 4/6) and yellowish brown (10YR 5/4) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thick patchy clay films; extremely acid; gradual smooth boundary.
B23t—22 to 32 inches, red (2.5YR 4/6) and yellowish brown (10YR 5/6) clay; few fine distinct light

brownish gray (10YR 6/2) mottles; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; extremely acid; gradual smooth boundary.

B3—32 to 41 inches, red (2.5YR 4/6) clay; yellowish brown (10YR 5/6), red (10R 4/8), and light gray (5Y 7/2) mottles; weak fine subangular blocky structure; friable, slightly sticky, plastic; extremely acid; gradual wavy boundary.

C1—41 to 60 inches, variegated saprolite that crushes to clay loam; massive; friable, slightly sticky, plastic; extremely acid,

The thickness of the solum ranges from 32 to 47 inches. Reaction is very strongly acid or extremely acid.

The A horizon has hue of 5YR or 7.5YR and value and chroma of 3 or 4.

The B horizon has hue of 10R through 5YR, value of 4 or 5, and chroma of 6 to 8. Structure ranges from moderate fine or medium to weak fine or medium subangular blocky. Clay films in the Bt horizon range from thick to thin.

Corozo series

The soils of the Corozo series are sandy over clayey, siliceous, isohyperthermic Orthoxic Tropudults. They are deep and well drained and are on coastal plains. They formed in coarse textured quartz sediments. The Corozo soils are mainly used for pangolagrass and coconuts. Some small areas are in native pasture. Slopes range from 2 to 12 percent.

Corozo soils are associated with Algarrobo, Jobos, Carrizales, Arecibo, and Guerrero soils. The Corozo soils have less illuvial organic matter than the Algarrobo soils; and the Carrizales, Guerrero, and Jobos soils have no organic matter. The Corozo soils do not have the plinthite layers typical of the Guerrero and Jobos soils but have an argillic horizon that is not typical of the Arecibo soils.

Typical pedon of Corozo fine sand, 2 to 12 percent slopes, 600 meters west of the Officers' Club of Camp Tortuguero in a field of native pasture:

A11—0 to 4 inches, gray (10YR 5/1) fine sand; single grain; loose, nonsticky, nonplastic; many fine roots; 15 percent black (10YR 2/1) spherical and elongated friable organic matter accumulations 1/4 inch thick; very strongly acid; clear wavy boundary.

A12—4 to 12 inches, gray (10YR 6/1) fine sand; single grain; loose; nonsticky, nonplastic; common fine roots; 15 percent black (10YR 2/1) rounded and elongated friable organic matter accumulations 1/4 inch thick; very strongly acid; clear wavy boundary.

A2—12 to 18 inches, light gray (10YR 7/1) fine sand; single grain, loose, nonsticky, nonplastic; few fine roots; tongues of A12 horizon in root channels; very strongly acid; abrupt smooth boundary.

B21h—18 to 19 inches, black (10YR 2/1) sandy loam; single grain; loose, nonsticky, nonplastic; very strongly acid; abrupt smooth boundary.

IIB22ht—19 to 20 inches, very dark grayish brown (10YR 3/2) sandy loam; single grain; loose, nonsticky, nonplastic; few clay bridges between sand grains; very strongly acid; clear wavy boundary.

IIB23ht—20 to 24 inches, very dark brown (10YR 2/2) sandy clay loam; single grain; loose, nonsticky, nonplastic; thin clay coatings on sand grains, common clay bridges between grains and small pockets of clay; very strongly acid; abrupt irregular boundary.

IIB24t—24 to 33 inches, pale brown (10YR 6/3) clay; moderate coarse prismatic structure; firm, slightly sticky, plastic; brown (7.5YR 5/2) stains along old root channels and cleavage planes; very strongly acid; clear wavy boundary.

IIIC1—33 to 40 inches, brown (10YR 5/3) loamy sand; massive; extremely firm, nonsticky, nonplastic; dark brown (7.5YR 4/4) stains along old root channels and cleavage planes; very strongly acid; gradual wavy boundary.

IIIC2—40 to 60 inches, light gray (2.5Y 7/2) sandy clay loam; massive; very firm, nonsticky, slightly plastic; very strongly acid.

The thickness of the solum ranges from 30 to 60 inches. The depth to the horizon of accumulation of illuvial organic matter ranges from 13 to 26 inches. Reaction ranges from very strongly acid to extremely acid.

The A horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or less.

The A2 horizon has hue of 10YR, value of 7 or 8, and chroma of 1 or less.

The Bh and Bht horizons have hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 or 2. They range from loamy sand to sandy clay loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 to 6, and chroma of 2 to 4. It ranges from clay to sandy clay.

The C horizon has hue of 7.5YR through 2.5Y, value of 4 to 8, and chroma of 2 to 6. It is sandy loam or loamy sand.

Coto series

The soils of the Coto series are clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox. They are deep and well drained and are on coastal plains. They formed in fine textured sediments derived from limestone. The Coto soils are mostly used for sugarcane and pasture. Some areas are in food crops. Slopes range from 2 to 12 percent.

Coto soils are associated with Espinosa, Almirante, and Aceitunas soils. The Coto soils do not have the

argillic horizon typical of each of the associated soils and have more yellow than the Aceitunas soils.

Typical pedon of Coto clay, 2 to 5 percent slopes, 870 meters southeast of kilometer marker 0.1 of Highway 484, in a pasture:

Ap—0 to 8 inches, dark reddish brown (5YR 3/4) clay; weak fine subangular blocky structure parting to moderate fine granular; firm, slightly sticky, plastic; many fine roots; many quartz grains; very strongly acid; clear smooth boundary.

B21—8 to 15 inches, yellowish red (5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; many fine quartz grains; very strongly acid; gradual smooth boundary.

B22—15 to 27 inches, yellowish red (5YR 4/6) clay; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; thin patchy clay films; many quartz grains; strongly acid; gradual smooth boundary.

B23—27 to 34 inches, strong brown (7.5YR 5/6) clay; weak fine and medium subangular blocky structure; friable, slightly sticky, plastic; few fine roots; thin patchy clay films; many quartz grains; strongly acid; gradual smooth boundary.

B24—34 to 46 inches, strong brown (7.5YR 5/6) clay; weak medium and coarse subangular blocky structure; friable, slightly sticky, plastic; thin discontinuous clay films; many fine quartz grains; strongly acid; gradual smooth boundary.

B25—46 to 57 inches, strong brown (7.5YR 5/6) clay; few fine distinct red (2.5YR 4/6) mottles and few fine faint yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable, slightly sticky, plastic; thin discontinuous clay films; very strongly acid; gradual smooth boundary.

B26—57 to 75 inches, strong brown (7.5YR 5/6) clay; common fine distinct red (2.5YR 4/6) and yellowish brown (10YR 5/6) mottles; weak medium and coarse subangular blocky structure; friable, slightly sticky, plastic; strongly acid.

The thickness of the solum and the depth to hard limestone are more than 40 inches. Reaction is very strongly acid or strongly acid.

The A horizon has hue of 5YR or 7.5YR and value and chroma of 3 or 4.

The upper part of the B horizon has hue of 5YR, value of 4, and chroma of 4 to 6. Structure is weak or moderate subangular blocky. Clay films range from patchy to discontinuous. The lower part of the B horizon has hue of 7.5YR, value of 4 or 5, and chroma of 6 to 8. Structure is weak medium or coarse subangular blocky.

Cuchillas series

The soils of the Cuchillas series are loamy, mixed, isothermic, shallow Typic Humitropepts. They are moderately deep and well drained and are on uplands. They formed in moderately fine textured residuum weathered from basic volcanic rocks. The Cuchillas soils are mainly in pasture. Some areas are in coffee. Slopes range from 40 to 60 percent.

Cuchillas soils are associated with Maricao, Humatas, and Los Guineos soils. The Cuchillas soils are shallower than the Maricao or Los Guineos soils, are coarser textured than the Humatas soils, have more yellow than the Maricao soils, and do not have the argillic horizon typical of the Los Guineos soils.

Typical pedon of Cuchillas silty clay loam, 40 to 60 percent slopes, 1.25 kilometers west of kilometer marker 38.4 of Highway 149, in a field of molassesgrass:

Ap—0 to 6 inches, dark brown (10YR 3/3) silty clay loam; moderate fine granular structure; firm, slightly sticky, slightly plastic; many fine roots; 5 percent fine gravel; strongly acid; clear smooth boundary.

B—6 to 16 inches, dark yellowish brown (10YR 3/4) silty clay loam; weak fine subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; 5 percent gravel; strongly acid; clear smooth boundary.

Cr—16 to 28 inches, dark yellowish brown (10YR 4/4) clay loam; massive; firm, slightly sticky, slightly plastic; few fine roots; 5 percent gravel and highly weathered volcanic rock; medium acid.

R—28 inches, semiconsolidated volcanic rock.

The thickness of the solum ranges from 12 to 20 inches. The depth to the semiconsolidated volcanic rock ranges from 20 to 34 inches.

Reaction is strongly acid or very strongly acid in the A and B horizons and slightly acid or medium acid in the C horizon. The content of volcanic gravel ranges from 0 to 5 percent in the profile.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. It has weak or moderate fine granular structure.

The B horizon has hue of 10YR, value of 3 or 4, and chroma of 4 to 6. It is silty clay loam or silty clay. Structure is weak fine or medium subangular blocky.

Daguey series

The soils of the Daguey series are clayey, oxidic, isohyperthermic Orthoxic Tropohumults. They are deep and well drained and are on uplands. They formed in fine textured residuum weathered from basic volcanic rocks. The Daguey soils are in coffee, food crops, and pasture. Slopes range from 12 to 20 percent.

Daguey soils are associated with and have a thicker solum than Alonso and Humatas soils. The Daguey soils

also have higher chroma throughout than the Alonso soils and are more weathered than the Humatas soils.

Typical pedon of Daguey clay, 12 to 20 percent slopes, eroded, 50 meters south of a paved road that is 600 meters east of kilometer marker 0.5 of Highway 619:

Ap—0 to 8 inches, dark brown (7.5YR 4/4) clay; weak fine subangular blocky structure parting to weak fine granular; firm, slightly sticky, plastic; many fine roots; few fine black concretions; few fine volcanic quartz fragments; very strongly acid; clear smooth boundary.

A3—8 to 15 inches, reddish brown (5YR 4/4) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin continuous clay films; dark brown (7.5YR 4/4) on ped surfaces; few fine black concretions; very strongly acid; gradual smooth boundary.

B21t—15 to 29 inches, red (2.5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; very strongly acid; gradual smooth boundary.

B22t—29 to 42 inches, yellowish red (5YR 4/6) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; few thin patchy clay films; very strongly acid; gradual smooth boundary.

B3—42 to 56 inches, yellowish red (5YR 5/8), reddish yellow (5YR 6/8), red (2.5YR 4/8), and light gray (2.5Y 7/2) clay; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few thin patchy clay films; 30 percent saprolite; very strongly acid; gradual smooth boundary.

C—56 to 68 inches, variegated yellowish red, red, and white saprolite; silty clay loam; massive; very friable, slightly sticky, slightly plastic; very strongly acid.

The thickness of the solum ranges from 50 to 67 inches.

The A horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4.

The B horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. Structure ranges from weak to strong. Clay films range from continuous to patchy.

Espinosa series

The soils of the Espinosa series are clayey, mixed, isohyperthermic Typic Paleudults. They are deep and well drained and are on uplands and coastal plains. They formed in fine textured sediments of mixed origin. The Espinosa soils are in sugarcane, pangolagrass, and pasture. Slopes range from 2 to 12 percent.

Espinosa soils are associated with Almirante, Vega Alta, and Bayamon soils. The Espinosa soils do not have the plinthite layer typical of the Almirante and Vega Alta soils and have an argillic horizon not typical of the Bayamon soils.

Typical pedon of Espinosa sandy loam, 2 to 5 percent slopes, 30 meters east of kilometer marker 3.2 of Highway 119, in a sugarcane field:

Ap—0 to 10 inches, dark brown (10YR 4/3) sandy loam; weak fine granular structure; friable, nonsticky, nonplastic; many fine roots; very strongly acid; abrupt smooth boundary.

B21t—10 to 16 inches, strong brown (7.5YR 5/6) sandy clay; weak fine subangular blocky structure; firm, slightly sticky, plastic; many fine roots; very strongly acid; clear smooth boundary.

B22—16 to 36 inches, strong brown (7.5YR 5/6) clay; weak medium and fine subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; many black stains on ped surfaces; many fine quartz grains; very strongly acid; clear smooth boundary.

B23t—36 to 47 inches, strong brown (7.5YR 5/6) and yellowish red (5YR 5/8) clay; weak medium and fine subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin discontinuous clay films; many fine quartz grains; very strongly acid; clear smooth boundary.

B24t—47 to 66 inches, yellowish brown (10YR 5/8), yellowish red (5YR 5/8), and dark grayish brown (10YR 4/2) clay; yellowish brown coating on ped surfaces; weak medium subangular blocky structure; firm, slightly sticky, plastic; thin discontinuous clay films; very strongly acid.

The argillic horizon is thicker than 60 inches. The depth to plinthite is more than 60 inches. Reaction of the profile is strongly acid or very strongly acid.

The Ap horizon has hue of 10YR or 7.5YR, and value and chroma of 3 or 4. It is sandy loam, sandy clay loam, or clay. It ranges from nonsticky and nonplastic to slightly sticky and plastic.

The upper part of the B horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 6 or 8. The lower part of the B horizon has hue of 10YR through 5YR, value of 5 or 6, and chroma of 2 to 8. The B21t horizon is sandy clay or clay. Structure of the B horizon is weak or moderate fine or medium subangular blocky. Clay films range from patchy to discontinuous.

Garrochales series

The soils of the Garrochales series are marly, euic, isohyperthermic Limnic Troposaprists. They are deep and poorly drained and are on coastal plains and flood plains. They formed in the residuum of decomposed plant residue over marl. The Garrochales soils are mainly used for pasture. Some areas are in abandoned sugarcane fields. Slopes range from 0 to 2 percent.

Garrochales soils are associated with Palmar, Jareales, Tiburones, and Vigia soils. None of the associated soils are marly.

Typical pedon of Garrochales muck, 0.5 kilometer east and 1.4 kilometers south of kilometer marker 10.7 of Highway 682, in a native pasture field:

Oap—0 to 8 inches, black (N 2/0) broken face and rubbed muck; moderate fine granular structure; very friable, slightly sticky, slightly plastic; many fine roots; low mineral content; medium acid (pH 6.0 in water); clear smooth boundary.

Oa2—8 to 16 inches, very dark brown (10YR 2/2), broken face and rubbed muck; 60 percent fiber and 10 percent rubbed; massive; friable, slightly sticky, slightly plastic; few fine roots; low mineral content; extremely acid (pH 3.7 in water); clear smooth boundary.

Oa3—16 to 29 inches, black (10YR 2/1) broken face and rubbed muck; about 40 percent fiber and 10 percent rubbed; massive; friable, slightly sticky, slightly plastic; low mineral content; strongly acid (pH 5.2 in water); abrupt smooth boundary.

Oa4—29 to 46 inches, very dark grayish brown (10YR 3/2) broken face and rubbed muck; about 60 percent fiber and 15 percent rubbed; massive; friable, slightly sticky, slightly plastic; low mineral content; slightly acid; (pH 6.3 in water); abrupt smooth boundary.

IILca1—46 to 47 inches, bluish gray (5B 5/1) silt loam; massive; slightly sticky, slightly plastic; calcareous; moderately alkaline; clear smooth boundary.

IILca2—47 to 56 inches, light gray (10YR 7/1) silt loam; massive; slightly sticky, slightly plastic; calcareous; moderately alkaline; abrupt smooth boundary.

Oe4—56 to 74 inches, dark grayish brown (10YR 3/2) broken face and rubbed muck; about 60 percent fiber and 15 percent rubbed; massive; slightly sticky, slightly plastic; low mineral content; neutral (pH 6.8 in water)

The thickness of the organic layers and the depth to the marly layers range from 35 to 53 inches.

The Oap horizon is less than 5 percent fiber.

The subsurface organic layers have hue of 10YR, value of 2 and 3, and chroma of 1 or 2. The unrubbed fiber content ranges from 30 to 60 percent and the rubbed fiber content from 10 to 15 percent.

The marly layer is light gray or white silt loam or loam.

Guerrero series

The soils of the Guerrero series are clayey, oxidic, isohyperthermic Arenic Plinthic Paleudults. They are deep and excessively drained and are on coastal plains. They formed in sand underlain by clay that is at least 5 percent plinthite. The Guerrero soils are used for food crops and pasture. Slopes range from 2 to 12 percent.

Guerrero soils are associated with Jobos, Corozo, Algarrobo, Arecibo, and Carrizales soils. The Guerrero soils are better drained than the Jobos soils, and none of the other associated soils have the plinthite layers typical of the Guerrero soils. The Algarrobo, Arecibo, and Corozo soils have accumulations of illuvial organic matter that are not typical of the Guerrero soils.

Typical pedon of Guerrero sand, 2 to 12 percent slopes, 500 meters south of kilometer marker 85.0 of Highway 2, in a field of pangolagrass:

A11—0 to 10 inches, dark grayish brown (10YR 4/2) sand; single grain; very friable, nonsticky, nonplastic; many fine roots, medium acid; clear smooth boundary.

A12—10 to 24 inches, dark yellowish brown (10YR 4/4) sand; light gray (10YR 7/2) when dry; single grain; very friable, nonsticky, nonplastic; common fine roots; strongly acid; abrupt smooth boundary.

B21t—24 to 35 inches, yellowish brown (10YR 5/6), red (2.5YR 4/6), and yellowish red (5YR 5/8) sandy clay; weak fine and medium subangular blocky structure; firm, slightly sticky, slightly plastic; few fine roots; very strongly acid; clear smooth boundary.

B22t—35 to 43 inches, yellowish brown (10YR 5/6), white (10YR 8/1), and red (2.5YR 4/6) sandy clay; yellowish brown (10YR 5/6) rubbed; weak coarse subangular blocky structure; firm, slightly sticky, slightly plastic; very strongly acid; clear smooth boundary.

B23t—43 to 58 inches, yellowish brown (10YR 5/6), dark red (2.5YR 3/6), brownish yellow (10YR 6/6), light gray (10YR 7/1) and dusky red (10R 3/4) clay; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; very strongly acid.

The argillic horizon is more than 50 inches thick. The thickness of the sandy layers and the depth to plinthite range from 20 to 40 inches.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. Reaction ranges from slightly to medium acid.

The B horizon has hue of 5YR, through 10YR, value of 4 or 5, and chroma of 6 to 8. Structure ranges from weak fine to coarse subangular blocky. The horizon ranges from sandy clay to clay in the upper part and is clay in the lower part. Reaction is strongly acid or very strongly acid. The content of plinthite ranges from 6 to 20 percent or more, by volume.

Humatas series

The soils of the Humatas series are clayey, kaolinitic, isohyperthermic Typic Tropohumults. They are deep and well drained and are on uplands. They formed in fine textured residuum weathered from basic volcanic rock. The Humatas soils are mostly used for coffee, food crops, and pasture. Slopes range from 20 to 60 percent.

Humatas soils are associated with Daguey, Consumo, and Alonso soils. The Humatas soils have a thinner solum than the Daguey soils and a thicker solum than the Consumo soils. The Humatas soils have higher chroma throughout than the Alonso soils and have a higher cation exchange capacity.

Typical pedon of Humatas clay, 40 to 60 percent slopes, 1.1 kilometers from kilometer marker 6.6 of Highway 602, in a field of native fern and brush:

Ap—0 to 5 inches, reddish brown (5YR 4/4) clay; weak fine and medium granular structure; friable, slightly sticky, plastic; many fine roots; very strongly acid; clear smooth boundary.

B21t—5 to 12 inches, yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; very strongly acid; clear smooth boundary.

B22t—12 to 20 inches, yellowish red (5YR 4/8) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; very strongly acid; clear wavy boundary.

B3—20 to 30 inches, yellowish red (5YR 4/6) clay; weak fine and medium subangular blocky structure; friable, slightly sticky, plastic; 25 percent variegated reddish yellow, dark brown, red, and black saprolite; very strongly acid; clear wavy boundary.

C—30 to 56 inches, variegated reddish yellow, dark brown, red, and black saprolite that crushes to silty clay loam; massive; very friable, slightly sticky, plastic; very strongly acid.

The thickness of the solum ranges from 24 to 41 inches. The A horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6.

The B horizon has hue of 5YR or 2.5YR, value of 4 to 6, and chroma of 6 to 8. Structure is moderate fine or moderate medium subangular blocky.

The C horizon is silty clay loam or clay loam.

Hydraquents

Hydraquents are deep, poorly drained soils that formed in stratified loamy and clayey sediments deposited by floodwater. Hydraquents are in lagoons and depressional areas on the flood plains of the coastal lowlands. Slopes range from 0 to 2 percent.

Hydraquents are near Coloso, Bajura, Vega Alta, and Jobos soils. Hydraquents are at a lower position on the landscape and are more poorly drained than the Coloso soils, are at a lower position on the landscape and have more organic matter than the Bajura or Jobos soils, and are darker and more poorly drained than the Vega Alta soils.

Because of the variability of Hydraquents, a typical pedon is not given.

The thickness of the alluvial material is more than 60 inches. Reaction of the soils is slightly acid to mildly alkaline.

The A horizon has hue of 2.5Y and 5Y, value of 2 or 3, and chroma or 1 or 2. It ranges from sandy loam to clay.

The C horizon has hue of 5Y and 5BG, value of 4 to 6, and chroma of 1. It is dominantly clay but ranges to sandy clay.

Ingenio series

The soils of the Ingenio series are clayey, mixed, isohyperthermic Typic Tropudults. They are deep and well drained and are on uplands. They formed in the residuum of medium textured and fine textured sediments of intrusive volcanic rock. The Ingenio soils are in coffee, food crops, and pasture. Slopes range from 12 to 40 percent.

Ingenio soils are associated with Lirios and Pellejas soils. The Ingenio soils have a thicker solum than either of the associated soils, have more red than the Pellejas soils, and have an argillic horizon that is not characteristic of the Pellejas soils.

Typical pedon of Ingenio clay loam, 5 to 20 percent slopes, 25 meters south of kilometer marker 0.5 of Highway 6602, in a field of pangolagrass:

Ap—0 to 6 inches, dark brown (7.5YR 4/4) clay loam; moderate fine and medium granular structure; firm, slightly sticky, plastic; many fine roots; many fine quartz grains; very strongly acid; clear smooth boundary.

B21t—6 to 11 inches, red (2.5YR 4/8) and dark brown (7.5YR 4/4) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; thin patchy clay films; many fine quartz grains; very strongly acid; clear smooth boundary.

B22t—11 to 17 inches, red (2.5YR 4/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; thin patchy clay films; many fine quartz grains; very strongly acid; clear smooth boundary.

B23t—17 to 26 inches, red (2.5YR 4/8) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; many fine quartz grains; very strongly acid; clear wavy boundary.

B3—26 to 38 inches, red (2.5YR 4/8, 4/6) and brownish yellow (10YR 6/8) clay; weak fine subangular blocky structure; firm, slightly sticky, plastic; few fine roots; few thin patchy clay films; very strongly acid; 40 percent saprolite; clear wavy boundary.

C—38 to 60 inches, variegated red, yellow, brown, and dusky red saprolite that crushes to silty clay loam; massive; friable; slightly sticky, slightly plastic; very strongly acid.

The thickness of the solum ranges from 28 to 48 inches. The A horizon has hue of 10YR through 5YR, value of 4 or 5, and chroma of 3 or 4. The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 8. It is clay or silty clay. Structure ranges from weak medium to moderate fine or medium subangular blocky. The B3 horizon consists of 30 to 40 percent saprolite.

The C horizon ranges from strongly acid to very strongly acid.

Islote series

The soils of the Islote series are very fine, mixed, isohyperthermic Typic Tropudalfs. They are moderately deep and well drained and are on coastal plains. They formed in fine textured material derived from calcareous sandstone. The Islote soils are used mostly for pasture, sugarcane, and food crops. Slopes range from 2 to 12 percent.

Islote soils are associated with San German and Caracoles soils but are deeper to calcareous sandstone and have an argillic horizon that is not typical of either of those soils.

Typical pedon of Islote sandy clay loam, 2 to 12 percent slopes, 6 meters west of a dirt road, 33 meters south of kilometer marker 7.85 of Highway 681, in a field of a native pasture:

Ap—0 to 8 inches, dark brown (7.5YR 3/2) sandy clay loam; moderate fine granular; friable, nonsticky, slightly plastic; many fine roots; medium acid; clear smooth boundary.

B1—8 to 12 inches, dark brown (7.5YR 3/2) and dark red (2.5YR 3/6) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; common fine white specks; slightly acid; clear smooth boundary.

B21t—12 to 18 inches, dark red (2.5YR 3/6) clay; moderate medium and coarse subangluar blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; many white specks; neutral; gradual smooth boundary.

B22t—18 to 24 inches, dark red (2.5YR 3/6) clay; moderate coarse subangular blocky structure; firm, slightly sticky, plastic; thin discontinuous clay films; few black stains; many white specks; neutral; clear smooth boundary.

B3—24 to 30 inches, dark red (2.5YR 3/6) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; thin patchy clay films; many white specks; common fine sand grains; neutral; clear smooth boundary.

Cr—30 inches, partially cemented calcareous sandstone.

The thickness of the solum and the depth to partially cemented calcareous sandstone range from 27 to 43 inches.

The Ap horizon has hue of 7.5YR or 5YR, value of 3 or 4, and chroma of 2 to 4. It is medium acid or slightly acid.

The B2t horizon has hue of 2.5YR or 10R, value of 3 or 4, and chroma of 4 to 6. Structure is moderate medium coarse subangluar blocky. Clay films are thin patchy or thin discontinuous. Reaction is neutral or mildly alkaline.

Jareales series

The soils of the Jareales series are fine, mixed, nonacid, isohyperthermic Thapto-Histic Tropic Fluvaquents. They are deep and poorly drained and are on coastal plains. They formed in fine textured sediments of mixed origin over decomposed organic material. The Jareales soils are mostly used for sugarcane and pasture.

Jareales soils are associated with Bajura and Vigia soils. The Bajura soils do not have the underlying organic layer typical of the Jareales soils, and the Vigia soils do not have the mineral layers.

Typical pedon of Jareales clay, 1,150 meters north of kilometer marker 2.4 of Highway 682, in a sugarcane field:

Ap—0 to 6 inches, very dark gray (10YR 3/1) clay; few fine faint dark brown (7.5YR 4/4) mottles; weak medium subangular blocky structure parting to moderate medium granular; firm, slightly sticky, plastic; many fine roots; neutral; clear smooth boundary.

B1—6 to 13 inches, black (10YR 2/1) clay; yellowish red (5YR 4/8) along root channels and few fine faint yellowish brown (10YR 5/6) mottles; moderate medium and coarse subangular blocky structure with few pressure faces; firm, slightly sticky, plastic; common fine roots; neutral; gradual wavy boundary.

B21g—13 to 20 inches, very dark gray (10YR 3/1) clay; yellowish red (5YR 4/8) in root channels and many medium olive (5Y 5/3) mottles and few fine prominent greenish gray (5GY 5/1) mottles; weak fine and medium subangular blocky structure with few pressure faces; firm, slightly sticky, plastic; few fine roots; neutral; gradual wavy boundary.

B22g—20 to 28 inches, olive gray (5Y 5/2) clay; few fine faint strong brown (7.5YR 5/6) and greenish gray (5GY 5/1) mottles; weak coarse subangular blocky structure; firm, slightly sticky, plastic; decayed roots; neutral; abrupt smooth boundary.

Oa1—28 to 60 inches, black (N 2/0) broken face and rubbed muck; less than 5 percent fiber; massive; friable, slightly sticky, slightly plastic; low mineral content; slightly acid.

The depth to the organic horizon ranges from 21 to 35 inches. Reaction is neutral or slightly acid.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The upper part of the B horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The Bg horizon has hue of 10YR, 5Y, and 5GY; value of 2 to 5; and chroma of 1 or 2. Structure is weak fine to coarse subangular blocky.

Jobos series

The soils of the Jobos series are clayey, oxidic, isohyperthermic Plinthaquic Paleudults. They are deep and moderately well drained and are on uplands and coastal plains. They formed in sand underlain by clay and plinthite. The Jobos soils are mostly used for pangolagrass and native pasture. Slopes range from 2 to 12 percent.

Jobos soils are associated with Guerrero, Corozo, Algarrobo, Arecibo, and Carrizales soils. The Jobos soils are more poorly drained than the Guerrero soils; do not have the accumulation of illuvial organic matter typical of the Algarrobo, Arecibo, and Corozo soils; have plinthite layers that are not typical in the Carrizales, Algarrabo, Arecibo, or Corozo soils; and have an argillic horizon that is not typical of the Carrizales soils.

Typical pedon of Jobos sandy loam, 2 to 12 percent slopes, 4.75 kilometers west of the Police Headquarters on Highway 485, in a field of pangolagrass:

Ap—0 to 8 inches, dark brown (10YR 4/3) sandy loam; weak granular structure; friable, nonsticky, nonplastic; many fine roots; very strongly acid; abrupt smooth boundary.

B21t—8 to 14 inches, yellowish brown (10YR 5/6) and red (2.5YR 4/6) clay; dark gray (10YR 4/1) on ped surface; strong medium and coarse subangular blocky structure; firm, sticky, plastic; many thin discontinuous clay films; many fine roots; many fine quartz grains; extremely acid; clear wavy boundary.

B22t—14 to 22 inches, yellowish brown (10YR 5/6) and red (2.5YR 4/6) clay; dark gray (10YR 4/1) on ped surface; strong medium and coarse subangular blocky structure; firm, sticky, plastic; common fine roots; many thin discontinuous clay films; many quartz grains; very strongly acid; clear wavy boundary.

B23t—22 to 33 inches, yellowish brown (10YR 5/6), red (2.5YR 4/6, 5/8), and gray (10YR 6/1) clay; weak medium and coarse subangular blocky structure; firm, sticky, plastic; few fine roots; thin patchy clay films; many fine quartz grains; very strongly acid; clear wavy boundary.

B24t—33 to 40 inches, yellowish brown (10YR 5/6), gray (10YR 6/1), and yellowish red (5YR 5/8) clay; weak medium subangular blocky structure; firm, sticky, plastic; few thin patchy clay films; many quartz grains; very strongly acid; clear wavy boundary.

B25t—40 to 55 inches, yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and yellowish red (5YR 5/8) clay; yellowish brown (10YR 5/4) on ped surface; weak medium subangular blocky structure; firm, sticky, plastic; few thin patchy clay films; common black stains; many fine quartz grains; very strongly acid.

The thickness of the solum is more than 60 inches. The depth to plinthite ranges from 10 to 20 inches. Reaction of the soil ranges from strongly acid to extremely acid.

The A horizon has hue of 10YR, value of 4, and chroma of 2 or 3. It is granular or subangular blocky.

The B2t horizon consists of a reticular pattern of yellowish brown, strong brown, dark gray, gray, yellowish red, and red. B2t horizons range from weak to strong and from medium to coarse subangular blocky. Clay films are discontinuous or patchy. The content of plinthite ranges from 6 to 30 percent by volume.

Juncal series

The soils of the Juncal series are fine, mixed, isohyperthermic Typic Tropudalfs. They are deep and moderately well drained and are on uplands. They formed in fine textured residuum from limestone. The Juncal soils are mainly used for pasture and sugarcane. Some areas are in food crops. Slopes range from 12 to 40 percent.

Juncal soils are associated with Colinas, Naranjo, and Soller soils. The Juncal soils are deeper than the Colinas or Soller soils, are finer textured than the Colinas soils, are lighter colored than the Naranjo soils, and have an argillic horizon that is not typical in the Soller and Naranjo soils.

Typical pedon of the Juncal clay, 12 to 20 percent slopes, eroded, 25 meters east of kilometer marker 11.5 of Highway 647, in a plantain field:

Ap—0 to 8 inches, dark brown (10YR 4/3) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; evidence of earthworm activity; medium acid; clear smooth boundary.

B21t—8 to 14 inches, yellowish brown (10YR 5/6) and dark brown (10YR 4/3) clay; moderate medium and coarse subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; black stains from root decay; neutral; gradual smooth boundary.

B22t—14 to 22 inches, yellowish brown (10YR 5/6) clay; few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; neutral; gradual wavy boundary.

B23t—22 to 32 inches, yellowish brown (10YR 5/6) clay; common fine prominent yellowish red (5YR 5/6 and

5/8) mottles; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; common thin patchy clay films; neutral; gradual wavy boundary.

B24t—32 to 40 inches, yellowish brown (10YR 5/6) clay; few fine distinct pinkish gray (7.5YR 7/2) mottles; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; few thin patchy clay films; neutral; abrupt smooth boundary.

C—40 to 60 inches, yellowish brown (10YR 5/6) silty clay loam; few fine distinct light gray (7.5YR 7/0) mottles; massive; friable, slightly sticky, plastic; strong effervescence; moderately alkaline.

The thickness of the solum ranges from 37 to 49 inches.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 or 3. Reaction is medium acid to neutral.

The B2t horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. Structure is weak or moderate and fine to coarse subangular blocky. Reaction is neutral to mildly alkaline in the upper part and mildly alkaline to moderately alkaline in the lower part.

Lirios series

The soils of the Lirios series are clayey over loamy, mixed, isohyperthermic Typic Tropudults. They are deep and well drained and are on uplands. They formed in fine textured and moderately fine residuum from plutonic rock. The Lirios soils are mainly used for coffee, pasture, and food crops. Slopes range from 20 to 60 percent.

Lirios soils are associated with Ingenio and Pellejas soils. The Lirios soils have a thinner solum than the Ingenio soils, have more red than the Pellejas soils, and have an argillic horizon that is not typical of the Pellejas soils.

Typical pedon of Lirios clay loam, 40 to 60 percent slopes, eroded, 300 meters west of kilometer marker 2.55 of Highway 523, in a field of pangolagrass:

Ap—0 to 6 inches, brown (7.5YR 4/4) clay loam; weak fine subangular blocky structure parting to weak fine granular; friable, slightly sticky, plastic; many fine roots; many fine quartz grains; strongly acid; clear smooth boundary.

B2t—6 to 15 inches, red (2.5YR 5/8) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; many fine quartz grains; strongly acid; clear smooth boundary.

B3—15 to 24 inches, reddish yellow (5YR 6/8) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; many quartz grains; 25 percent variegated very pale brown, red, and brownish yellow saprolite; very strongly acid; gradual wavy boundary.

C—24 to 60 inches, variegated yellowish brown (5YR 5/6), dark yellowish brown (10YR 4/4), strong brown (7.5YR), reddish yellow (7.5YR 7/6), pale yellow (2.5Y 8/4), yellow (10YR 7/6), and white saprolite that is silty clay loam; massive; friable, slightly sticky, slightly plastic; many fine quartz grains; very strongly acid.

The thickness of the solum ranges from 20 to 30 inches. Reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 3 or 4.

The B2 horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is silty clay or clay. Structure is weak or moderate subangular blocky. Clay films range from patchy to discontinuous.

The C horizon ranges from silty clay loam to loam.

Los Guineos series

The soils of the Los Guineos series are clayey, mixed, isothermic Epiaquic Tropohumults. They are deep and moderately well drained and are on uplands. They formed in fine textured residuum from highly weathered volcanic rock. The Los Guineos soils are mainly in coffee, food crops, and pasture. Slopes range from 12 to 60 percent.

The Los Guineos soils are associated with the Humatas, Consumo, and Maricao soils. The Los Guineos soils have a thicker solumn and are less well drained than any of the associated soils.

Typical pedon of Los Guineos clay, 12 to 20 percent slopes, 475 meters north of kilometer 4.1 of Highway 608, in a coffee field:

Ap—0 to 6 inches, dark brown (7.5YR 4/4) clay; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; very strongly acid; clear smooth boundary.

B21t—6 to 12 inches, brown (7.5YR 5/4) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; very strongly acid; gradual smooth boundary.

B22t—12 to 19 inches, brown (7.5YR 5/4) clay; few fine faint yellowish red (5YR 4/8) mottles; moderate medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin continuous clay films; very strongly acid; gradual wavy boundary.

B23t—19 to 35 inches, red (2.5YR 4/6) clay; common fine distinct yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; firm, slightly sticky, plastic; very strongly acid; gradual smooth boundary.

B3—35 to 46 inches, red (2.5YR 4/6) clay; common fine distinct brownish yellow (10YR 6/6) mottles and few fine prominent very pale brown (10YR 8/3) mottles; weak fine and medium subangular blocky structure;

firm, slightly sticky, plastic; very strongly acid; clear smooth boundary.

C1—46 to 62 inches, variegated saprolite; yellowish red (5YR 4/8), reddish gray (5YR 5/2), pale red (10R 6/2) and reddish yellow (7.5YR 7/6) clay; massive; friable, slightly sticky, slightly plastic; very strongly acid.

The thickness of the solum ranges from 36 to 58 inches. Reaction ranges from very strongly acid to extremely acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 5.

The upper part of the B horizon has hue of 7.5YR, value of 4 to 6, and chroma of 4 to 8. The lower part of the B horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 to 8. Structure of the B2t horizon is moderate or strong subangular blocky.

Maraguez series

The soils of the Maraguez series are fine-loamy, mixed, isohyperthermic Typic Eutropepts. They are deep and well drained and are on uplands. They formed in moderately fine textured and medium textured residuum of highly weathered basic volcanic rock. The Maraguez soils are mostly used for coffee, pasture, and food crops. Slopes range from 40 to 60 percent.

Maraguez soils are associated with Mucara, Caguabo, and Morado soils. The Maraguez soils are deeper than any of the associated soils, are coarser textured than the Mucara soils, and have a thicker solum than the Caguabo or Morado soils.

Typical pedon of Maraguez silty clay loam, 40 to 60 percent slopes, eroded, 1.25 kilometers north of kilometer marker 46.2 of Highway 10, in a coffee plantation:

Ap—0 to 7 inches, dark brown (10YR 3/3) silty clay loam; moderate fine and medium granular structure; friable, slightly sticky, plastic; many fine roots; 2 to 5 percent volcanic fragments 1/4 to 1/2 inch wide; medium acid; clear smooth boundary.

B2—7 to 15 inches, dark yellowish brown (10YR 4/4) silty clay loam; dark brown (10YR 3/3) on ped surfaces; weak fine and medium subangular blocky structure; friable, slightly sticky, plastic; many fine roots; many fine volcanic fragments; slightly acid; gradual smooth boundary.

B3—15 to 21 inches, yellowish brown (10YR 5/6) clay loam; weak fine subangular blocky structure; friable, slightly sticky, plastic; few fine roots; many fine volcanic fragments; 20 percent saprolite variegated with brownish yellow, very dark gray, and light olive brown; slightly acid; gradual smooth boundary.

C1—21 to 33 inches, yellowish brown (10YR 5/6) loam variegated with brownish yellow (10YR 6/6), very dark gray (10YR 3/1), and brown (7.5YR 4/4); massive; very friable, nonsticky, slightly plastic; slightly acid; gradual smooth boundary.

C2—33 to 60 inches, brownish yellow (10YR 6/6) loam variegated with yellowish brown (10YR 5/6), very dark gray (10YR 3/1), and brown (7.5YR 4/4); massive; very friable, nonsticky, nonplastic; visible original rock structure can be crushed between fingers; slightly acid.

The thickness of the solum ranges from 18 to 24 inches. The depth to semiconsolidated volcanic rock is more than 60 inches. Reaction is medium acid or slightly acid throughout.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3.

The B2 horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. Structure is weak fine or medium subangular blocky.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 6. It is silt loam or loam.

Maricao series

The soils of the Maricao series are clayey, mixed, isothermic Dystropeptic Tropudults. They are well drained and moderately deep to saprolite and are on uplands. They formed in fine textured sediments from the residuum of highly weathered basic volcanic rock. The Maricao soils are mainly used for coffee, food crops, and pasture. Slopes range from 40 to 60 percent.

Maricao soils are associated with Los Guineos, Cuchillas, and Humatas soils. The Maricao soils have a thinner argillic horizon than the Los Guineos or Humatas soils and are better drained than the Los Guineos soils. The Maricao soils are deeper and have more red than the Cuchillas soils.

Typical pedon of Maricao clay, 40 to 60 percent slopes, 630 meters north of kilometer marker 16.5 of Highway 143, in a field of ferns and molassesgrass:

Ap—0 to 6 inches, yellowish red (5YR 4/6) clay; weak fine subangular blocky structure parting to weak fine granular; friable, slightly sticky, plastic; many fine roots; few fine quartz grains; very strongly acid; clear smooth boundary.

B2t—6 to 14 inches, yellowish red (5YR 5/8) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; few fine quartz grains; very strongly acid; clear smooth boundary.

B3—14 to 20 inches, red (2.5YR 5/8) clay; common fine distinct very pale brown (10YR 7/3) mottles and common medium prominent red (10YR 5/6) mottles; weak fine subangular blocky structure; friable, slightly sticky, plastic; few fine roots; few fine quartz grains; 30 percent saprolite; very strongly acid; gradual wavy boundary.

C—20 to 60 inches, red (2.5YR 5/8) silty clay loam; common fine distinct very pale brown (10YR 7/3) mottles and common medium prominent red (10YR 5/6) mottles; massive, very friable, slightly sticky, slightly plastic; few fine quartz grains; very strongly acid.

The thickness of the solum ranges from 15 to 23 inches. Reaction is extremely acid or very strongly acid.

The A horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. Structure is weak fine subangular blocky or granular.

The B2t horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 6 to 8. Structure is weak fine or medium subangular blocky. Clay films are patchy or discontinuous.

The C horizon is silty clay or silty clay loam.

Matanzas series

The soils of the Matanzas series are clayey, oxidic, isohyperthermic Tropeptic Eutrorthox. They are deep and well drained and are on coastal plains and uplands. They formed in fine textured sediments over hard limestone. The Tanama soils are mostly used for pineapples, sugarcane, and pasture. Some areas are in food crops. Slopes range from 2 to 5 percent.

Matanzas soils are associated with Bayamon, Almirante, and Tanama soils. The Matanzas soils have a thinner solum and are shallower than the Bayamon soils; are shallower than and do not have the plinthite layers typical of the Almirante soils; and are deeper and have more red than the Tanama soils.

Typical pedon of Matanzas clay, 2 to 5 percent slopes, 15 meters south of a dirt road that is 1 mile west of Highway 695:

Ap—0 to 8 inches, dark reddish brown (2.5YR 3/4) clay; moderate fine granular structure; friable, slightly sticky, plastic; many fine roots; neutral; gradual smooth boundary.

B21—8 to 18 inches, dusky red (10R 3/4) clay; weak medium subangular blocky structure parting to weak fine granular; friable, slightly sticky, plastic; many fine roots; many fine quartz grains; neutral; gradual smooth boundary.

B22—18 to 32 inches, dark red (10R 3/6) clay; weak medium subangular blocky structure; friable, slightly sticky, plastic; common fine roots; common fine black stains; few quartz grains; neutral; gradual wavy boundary.

B23—32 to 42 inches, red (10R 4/6) clay; medium subangular blocky structure; very friable; slightly sticky, plastic; few fine roots; few fine black stains; neutral; abrupt wavy boundary.

R—42 inches, white hard fragmental limestone with red stains.

The thickness of the solum and the depth to hard limestone range from 40 to 60 inches. Reaction is slightly acid or neutral.

The A horizon has hue of 2.5YR or 5YR, value of 3, and chroma of 2 to 4.

The B horizon has hue of 2.5YR or 10R, value of 3 or 4, and chroma of 4 to 8. Structure ranges from weak coarse to medium subangular blocky.

Moca series

The soils of the Moca series are clayey, mixed, isohyperthermic Vertic Tropudults. They are deep and moderately well drained and are on uplands and coastal plains. They formed in fine textured material over plastic clay, gravel, and cobblestones. The Moca soils are used for coffee, pasture, and food crops. Slopes range from 2 to 40 percent.

Moca soils are associated with Perchas and Voladora soils. The Moca soils are redder and better drained than the Perchas soils and are not as well drained as the Voladora soils.

Typical pedon of Moca clay, 2 to 12 percent slopes, eroded, 40 meters east of kilometer marker 55.3 of Highway 155, in a pangolagrass field:

Ap—0 to 6 inches, dark reddish brown (5YR 3/4) clay; red (2.5YR 4/8) stringers from the B1 horizon; weak fine subangular blocky structure; firm; slightly sticky, plastic; many fine roots; very strongly acid; clear smooth boundary.

B1—6 to 10 inches, red (2.5YR 4/8) and dark reddish brown (5YR 3/4) clay; few fine distinct brown (10YR 5/4) mottles; weak medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; thin patchy clay films; very strongly acid; gradual smooth boundary.

B2t—10 to 17 inches, red (2.5YR 4/8) and yellowish brown (10YR 5/6) clay; few fine distinct light brownish gray (10YR 6/2) mottles; moderate medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; thin discontinuous clay films; very strongly acid; gradual smooth boundary.

B3—17 to 30 inches, very pale brown (10YR 7/3), red (2.5YR 4/8), and brownish yellow (10YR 6/6) clay; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; thin patchy clay films; common pressure faces and slickensides; very strongly acid; clear wavy boundary.

C1—30 to 36 inches, light brownish gray (10YR 6/2) and dark red (7.5R 3/8) clay; few fine distinct yellowish brown (10YR 5/8) mottles; massive; slightly sticky, plastic; few fine roots; common pressure faces and slickensides; very strongly acid; gradual wavy boundary.

C2—36 to 50 inches, light gray (10YR 7/1) and red (2.5YR 4/8) clay; few distinct brownish yellow (10YR 6/8) mottles; massive; firm, slightly sticky, plastic; few fine roots; common pressure faces and slickensides; very strongly acid; gradual wavy boundary.
C3—50 to 60 inches, light gray (10YR 7/1) clay; few red and strong brown mottles; massive; firm, slightly sticky, plastic; many pressure faces and slickensides; very strongly acid.

The thickness of the solum ranges from 28 to 38 inches. Reaction throughout is very strongly acid or extremely acid.

The Ap horizon has hue of 7.5YR or 5YR, value of 3 or 4, and chroma of 2 to 4.

The B horizon is variegated red, brown, and grayish brown. Structure is weak or moderate medium subangular blocky. Clay films range from patchy to discontinuous.

The C horizon is gray and yellowish brown, brownish yellow, and strong brown.

Morado series

The soils of the Morado series are fine-loamy, mixed, isohyperthermic Typic Eutropepts. They are moderately deep and well drained and are on uplands. They formed in moderately fine textured residuum weathered from reddish brown volcanic rock. The Morado soils are commonly pastured. Some areas are in coffee and food crops. Slopes range from 40 to 60 percent.

Morado soils are associated with Mucara, Maraguez, and Caguabo soils. The Morado soils are coarser textured and have a thicker solum than the Mucara soils, are shallower than the Maraguez soils, and are deeper than the Caguabo soils.

Typical pedon of Morado clay loam, 40 to 60 percent slopes, eroded, 15 meters south of kilometer marker 0.5 of Highway 615, in a pasture:

Ap—0 to 9 inches, dark reddish brown (5YR 3/3) clay loam; moderate fine granular; friable, slightly sticky, slightly plastic; many fine roots; few fine black concretions; slightly acid; clear smooth boundary.
B2—9 to 15 inches, weak red (2.5YR 4/2) clay loam; weak fine subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; few fine volcanic fragments; slightly acid; clear smooth boundary.
B3—15 to 22 inches, reddish brown (5YR 4/4), grayish brown (2.5Y 5/2), yellowish red (5YR 5/6), and dark reddish brown (2.5YR 3/2) clay loam; weak fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; few fine roots; few fine volcanic fragments; slightly acid; clear smooth boundary.
C—22 to 36 inches, variegated reddish brown (5YR 4/4), yellowish brown (10YR 5/6), light gray (10YR 7/1), and dark reddish brown (2.5YR 3/4) clay loam; massive; friable, slightly sticky, slightly plastic; slightly acid; clear smooth boundary.
R—36 inches, variegated semiconsolidated volcanic rock.

The thickness of the solum ranges from 16 to 28 inches. The depth to the semiconsolidated volcanic rock ranges from 26 to 40 inches. Reaction ranges from slightly acid to neutral.

The A horizon has hue of 5YR or 2.5YR, value of 3 to 5, and chroma of 1 to 3.

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 2 to 4. It ranges from clay loam to silty clay loam. Structure is weak fine or medium subangular blocky.

The C horizon ranges from clay loam to loam.

Mucara series

The soils of the Mucara series are fine, montmorillonitic, isohyperthermic, paralithic Vertic Eutropepts. They are moderately deep and well drained and are on uplands. They formed in fine residuum weathered from basic volcanic rock. The Mucara soils are mainly used for coffee, food crops, and pasture. Slopes range from 20 to 60 percent.

Mucara soils are associated with Caguabo, Maraguez, and Morado soils. The Mucara soils have a thicker solum and are finer textured than the Caguabo soils, are finer textured and shallower than the Maraguez soils, and are finer textured and have a thinner solum than the Morado soils.

Typical pedon of Mucara clay, 20 to 40 percent slopes, 15 meters south of paved road, 0.9 mile east of kilometer marker 0.5 of Highway 619:

Ap—0 to 6 inches, very dark grayish brown (10YR 3/2) clay; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; slightly acid; clear smooth boundary.
B2—6 to 13 inches, dark yellowish brown (10YR 4/4) and dark grayish brown (10YR 4/2) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; commmon fine roots; neutral; clear smooth boundary.
C1—13 to 19 inches, dark yellowish brown (10YR 4/4), very dark grayish brown (10YR 3/2), and light olive brown (2.5Y 5/4) clay loam; massive; friable, slightly sticky, slightly plastic; few fine roots; neutral; clear smooth boundary.
C2—19 to 27 inches, highly weathered volcanic rock; massive; friable.
R—27 inches, semiconsolidated volcanic rock.

The thickness of the solum ranges from 10 to 17 inches. The depth to semiconsolidated volcanic rock ranges from 20 to 35 inches. Reaction is slightly acid to neutral throughout.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3.

The B horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 to 4. It is silty clay or clay. It has weak fine or medium subangular blocky structure.

Naranjo series

The soils of the Naranjo series are fine, mixed, isohyperthermic Eutropeptic Rendolls. They are deep and well drained and are on uplands. They formed in fine textured residuum from soft limestone. The Naranjo soils are mainly used for pangolagrass and sugarcane. Some areas are used for food crops. Slopes range from 12 to 60 percent.

Naranjo soils are associated with Colinas and Juncal soils. The Naranjo soils are finer textured and deeper than the Colinas soils, have a darker surface layer than the Juncal soils, and do not have the argillic horizon typical of the Juncal soils.

Typical pedon of Naranjo clay, 20 to 40 percent slopes, 350 meters south of kilometer marker 3.2 of Highway 646, in a field of native pasture and pangolagrass:

Ap—0 to 8 inches, very dark grayish brown (10YR 3/2) clay; moderate fine granular structure; firm, slightly sticky, plastic; many fine roots; 5 percent limestone fragments; few shell fragments; strong effervescence, moderately alkaline; clear smooth boundary.

B1—8 to 12 inches, yellowish brown (10YR 5/6) clay; very dark grayish brown (10YR 3/2) strings from Ap horizon; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; 5 percent limestone fragments; few shell fragments; strong effervescence, moderately alkaline; clear smooth boundary.

B2—12 to 17 inches, yellowish brown (10YR 5/6) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; black stains from earthworm activity; 10 percent limestone fragments; strong effervescence, moderately alkaline; clear wavy boundary.

B3—17 to 22 inches, yellowish brown (10YR 5/6) and brownish yellow (10YR 6/6) clay; weak fine subangular blocky structure; firm, slightly sticky, plastic; few fine roots; common medium lime splotches; violent effervescence; moderately alkaline; gradual wavy boundary.

C1—22 to 41 inches, brownish yellow (10YR 6/8) and yellowish brown (10YR 5/6) clay; common prominent light gray (10YR 7/1) mottles; massive; firm, slightly sticky, plastic; many lime splotches; violent effervescence; gradual wavy boundary.

C2—41 to 60 inches, mixed very pale brown (10YR 8/3), pink (7.5YR 7/4), brownish yellow (10YR 6/8), and light gray (10YR 7/1) clay; massive; friable, slightly sticky, plastic; many lime splotches; violent effervescence; moderately alkaline.

The thickness of the solum ranges from 18 to 25 inches. The content of limestone fragments and limestone splotches ranges from 0 to 10 percent.

The Ap horizon has hue of 10YR and value and chroma of 2 or 3.

The B horizon has hue of 7.5YR or 10YR, value of 5 to 7, and chroma of 6 to 8. Structure is weak fine or medium subangular blocky.

The C horizon is yellowish brown, brownish yellow, pale brown, pink, and light gray.

Palmar series

The soils of the Palmar series are euic, isohyperthermic Typic Troposaprists. They are deep and poorly drained and are on coastal plains and flood plains. They formed in the residuum of partially and completely decomposed plants. The Palmar soils are mostly used for pasture. Slopes range from 0 to 2 percent.

Palmar soils are associated with Garrochales, Tiburones, and Vigia soils. The Palmar soils are more alkaline than the Tiburones soils and do not have the underlying marly layer typical of the Garrochales soils or the mineral layers typical of the Vigia soils.

Typical pedon of Palmar muck, 3.2 kilometers east of a dirt road, 2.1 kilometers north of kilometer marker 10.7 of Highway 682, in a marshy area:

Oap—0 to 8 inches, black (N 2/0) broken face and rubbed muck; 5 percent fiber, less than 5 percent rubbed; moderate fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; low mineral content; neutral; clear smooth boundary.

Oa1—8 to 15 inches, black (N 2/0) broken face and rubbed muck; 10 percent fiber, less than 5 percent rubbed; weak medium subangular blocky structure; firm, slightly sticky, slightly plastic; common fine roots; low mineral content; neutral clear smooth boundary.

Oa2—15 to 23 inches, very dark brown (10YR 2/2) broken face and black (10YR 2/1) rubbed muck; 35 percent fiber, 5 percent rubbed; massive; slightly sticky, slightly plastic; low mineral content; gradual smooth boundary.

Oa3—23 to 37 inches, dark yellowish brown (10YR 3/4) broken face and very dark brown (10YR 2/2) rubbed and pressed muck; 60 percent fiber, 15 percent rubbed; massive; slightly sticky, slightly plastic; low mineral content; neutral; gradual smooth boundary.

Oa4—37 to 75 inches, black (10YR 2/1) broken face and rubbed muck; 35 percent fiber, 5 percent rubbed; massive; slightly sticky, slightly plastic; low mineral content; neutral.

The thickness of the organic material is more than 6 feet. The reaction of the profile is slightly acid or neutral.

The surface tier is neutral or has hue of 10YR, value of 2, and chroma of 0 or 1. The subsurface tier is neutral or has hue of 10YR, value of 2 and 3, and chroma of 0 to 4. The unrubbed fiber content is 5 to 10 percent of the surface tier and 5 to 60 percent of the subsurface and bottom tiers. Rubbed fiber content is 5 to 15 percent throughout.

Pellejas series

The soils of the Pellejas series are fine-loamy over sandy or sandy-skeletal, mixed, isohyperthermic Typic Dystropepts. These are deep and somewhat excessively drained and are on uplands. They formed in moderately coarse textured residuum from plutonic rock. The Pellejas soils are mostly used for coffee, pasture, and food crops. Some areas are used for tobacco. Slopes range from 40 to 60 percent.

The Pellejas soils are associated with Lirios and Ingenio soils. The Pellejas soils are yellower than and do not have the argillic horizon typical of either of the associated soils, and have a thinner solum than the Ingenio soils.

Typical pedon of Pellejas clay loam, 40 to 60 percent slopes, 15 meters west of kilometer marker 0.9 of Highway 531, in a field of pangolagrass:

Ap—0 to 6 inches, dark brown (10YR 4/3) clay loam; weak fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; many quartz grains; strongly acid; clear smooth boundary.

B2—6 to 11 inches, yellowish brown (10YR 5/4) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; many fine roots; many quartz grains; strong brown (10 YR smooth boundary.

B3—11 to 16 inches, yellowish brown (10YR 5/4) sandy loam; massive; friable, nonsticky, nonplastic; few fine roots; many quaratz grains; strong brown (10YR 5/8), dark gray (5Y 4/1), and white (2.5Y 8/2) saprolite; strongly acid; clear smooth boundary.

C—16 to 62 inches, pale brown (10YR 6/3) loamy sand; yellowish brown (10YR 5/8), dark gray (5Y 4/1), and very dark gray (10YR 3/1) saprolite.

The thickness of the solum ranges from 11 to 20 inches. Reaction is very strongly acid or strongly acid. The amount of quartz grains is common or many.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The B2 horizon ranges from clay loam to sandy clay loam. The B3 horizon is sandy loam or loamy sand.

The C horizon is sandy loam or loamy sand.

Perchas series

The soils of the Perchas series are fine, mixed, acid isohyperthermic Typic Tropaquepts. They are deep and poorly drained and are on the coastal plains. They formed in fine textured sediments over tertiary clays. The Perchas soils are mostly used for pasture and food crops. Slopes range from 2 to 20 percent.

The Perchas soils are associated with the Moca and Voladora soils. The Perchas soils are yellower and more poorly drained than either of the associated soils.

Typical pedon of Perchas clay, 2 to 12 percent slopes, eroded, 30 meters south of dirt road, 315 meters east of kilometer marker 0.5 of Highway 145, in a field of pangolagrass:

Ap—0 to 7 inches, dark brown (10YR 4/3) clay; common medium distinct grayish brown (10YR 5/2) mottles; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; rust mottles from root decay; strongly acid; clear smooth boundary.

B2g—7 to 15 inches, light gray (2.5Y 7/0) clay; many medium distinct yellowish brown (10YR 5/8) mottles; weak medium and coarse subangular blocky structure; firm, sticky, plastic; common fine roots; strongly acid; clear smooth boundary.

B3g—15 to 24 inches, light olive gray (5Y 6/2) clay; common medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; firm, sticky, plastic; common fine roots; strongly acid; gradual smooth boundary.

C1g—24 to 38 inches, light gray (5Y 7/2) clay; common medium distinct yellowish brown (10YR 5/8) mottles; massive; firm, sticky, plastic; few fine roots; strongly acid; gradual wavy boundary.

C2g—38 to 58 inches, light olive gray (5Y 6/2) and yellowish brown (10YR 5/6) clay; massive; firm, slightly sticky, plastic; strongly acid.

The thickness of the solum ranges from 17 to 26 inches. Reaction is strongly acid or very strongly acid throughout.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3.

The B horizon has hue of 5Y or 2.5Y, value of 6 or 7, and chroma of 2 or less. Structure of the B horizon is weak medium or coarse subangular blocky.

Reilly series

The soils of the Reilly series are sandy-skeletal, mixed, isohyperthermic Mollic Fluvaquents. They are shallow to sand and gravel, are excessively drained, and are on flood plains. They formed in medium textured and moderately coarse textured sediments over sand and gravel. The Reilly soils are mostly used for pasture. Some small areas are in sugarcane. Slopes range from 0 to 2 percent.

Reilly soils are associated with Toa, Coloso, and Bajura soils. Reilly soils are better drained and coarser textured than the Coloso or Bajura soils and are coarser textured than the Toa soils.

Typical pedon of Reilly gravelly silt loam, 550 meters east of kilometer marker 77.0 of Highway 10, in a sugarcane field:

Ap—0 to 7 inches, dark brown (10YR 3/3) gravelly silt loam; weak fine granular; friable slightly sticky, nonplastic; many fine roots; many fine quartz grains and volcanic fragments; 25 percent gravel; medium acid; clear smooth boundary.

C1—7 to 13 inches, dark yellowish brown (10YR 3/4) gravelly sandy loam; massive; very friable, nonsticky, nonplastic; common fine roots; many fine quartz grains, 35 percent gravel; medium acid; abrupt smooth boundary.

C2—13 to 55 inches, coarse sand and gravel; single grain; loose; 60 percent gravel.

The thickness of the A horizon ranges from 7 to 10 inches thick. Reaction is medium acid or slightly acid.

The A horizon has hue of 10YR and value and chroma of 2 or 3. Structure is weak fine or medium granular. The horizon is 25 to 35 percent gravel.

The C horizon consists of 60 to 70 percent gravel.

Rio Lajas series

The soils of the Rio Lajas series are coarse-loamy, mixed, isohyperthermic Typic Tropudalfs. They are deep and somewhat excessively drained and are on the coastal plains. They formed in coarse textured sediments. The Rio Lajas soils are mainly used for pangolagrass, food crops, and pasture. Slopes range from 2 to 12 percent.

Rio Lajas soils are associated with Carrizales, Jobos, and Guerrero soils. The Rio Lajas soils are redder than the Carrizales soils and have an argillic horizon that is not characteristic of the Carrizales soils. The Rio Lajas soils are sandier than the Jobos or Guerrero soils but do not have the plinthite layers typical of those soils.

Typical pedon of Rio Lajas sand, 2 to 12 percent slopes, 0.8 kilometer west of the Camuy municipal cemetery, in a pasture:

Ap—0 to 11 inches, dark reddish brown (5YR 3/3) sand; single grain; loose; nonsticky, nonplastic; many fine roots; slightly acid; clear smooth boundary.

A12—11 to 17 inches, dark reddish brown (5YR 3/4) sand; single grain; loose; nonsticky, nonplastic; common fine roots; slightly acid; gradual smooth boundary.

A13—17 to 26 inches, dark reddish brown (5YR 3/4) loamy sand; single grain; loose, nonsticky, nonplastic; common fine roots; slightly acid; clear wavy boundary.

B21t—26 to 36 inches, dark reddish brown (2.5YR 3/4) sandy loam; massive; friable, nonsticky, nonplastic; few fine roots; neutral; gradual wavy boundary.

B22t—36 to 49 inches, dark red (2.5YR 3/6) sandy loam; massive; friable, slightly sticky, nonplastic; few fine roots; neutral; gradual wavy boundary.

B23t—49 to 64 inches, dark red (2.5YR 3/6) sandy loam; massive; friable, slightly sticky, nonplastic; few fine roots; netural; gradual wavy boundary.

B24t—64 to 77 inches, dark red (2.5YR 3/6) sandy clay loam; weak medium subangular blocky structure; friable, slightly sticky, slightly plastic; calcareous.

The thickness of the solum is more than 60 inches.

The A horizon has hue of 5YR, value of 3, and chroma of 3 or 4.

The B horizon has hue of 2.5YR or 5YR, value of 3, and chroma of 4 to 6. It ranges from sandy loam to sandy clay loam. Structure is weak medium or coarse subangular blocky.

Sabana Seca series

The soils of the Sabana Seca series are clayey, mixed, isohyperthermic Plinthic Tropaquults. They are deep and poorly drained and are on the coastal plains. They formed in fine textured coastal plain sediments and plinthite. The Sabana Seca soils are mainly used for pasture. Some areas are in sugarcane and food crops. Slopes range from 2 to 5 percent.

Sabana Seca soils are associated with Vega Alta and Almirante soils. Sabana Seca soils are more poorly drained and are at a lower elevation than either of the associated soils.

Typical pedon of Sabana Seca clay, 2 to 5 percent slopes, 30 meters north of Highway 690 and 65 meters east of the junction of Highways 689 and 690:

A—0 to 9 inches, very dark grayish brown (10YR 3/2) clay; moderate fine and medium granular structure; firm, slightly sticky, plastic; many fine roots; rust colors from root decay; very strongly acid; clear smooth boundary.

B1—9 to 15 inches, very dark gray (10YR 3/1) clay; many medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; firm, slightly sticky, plastic; many fine

roots; thin continuous clay films; very strongly acid; clear smooth boundary.

B21g—15 to 23 inches, very dark gray (10YR 3/1) clay; many medium distinct strong brown (7.5YR 5/8) mottles, many fine distinct gray (10YR 5/1) mottles, and few fine prominent red (2.5YR 4/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly sticky, plastic; common fine roots; thick continuous clay films; very strongly acid; clear wavy boundary.

B22g—23 to 37 inches, gray (10YR 6/1) clay; yellowish brown (10YR 5/6) and red (10R 4/8) mottles; weak coarse prismatic structure parting to moderate medium subangular blocky; firm, slightly sticky, plastic; thin patchy clay films; black stains from root decay; 10 percent plinthite; very strongly acid; gradual wavy boundary.

B23—37 to 52 inches, light gray (10YR 7/1) clay; brownish yellow (10YR 6/6) and dusky red (10R 3/4) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm, slightly sticky, plastic; thin patchy clay films; black stains from root decay; many fine iron concretions; 20 percent plinthite; very strongly acid; gradual wavy boundary.

B24—52 to 70 inches, light gray (10YR 7/1) clay; yellowish brown (10YR 5/8) and dark red (10R 3/6) mottles; weak medium prismatic structure; firm, slightly sticky, plastic; few patchy clay films; 25 percent plinthite; very strongly acid.

The thickness of the solum is more than 60 inches.

The Ap horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The B horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2. Structure is weak medium or coarse prismatic parting to subangular blocky. The plinthite content ranges from 15 to 25 percent.

San German series

The soils of the San German series are loamy-skeletal, carbonatic, isohyperthermic Lithic Ustorthents. They are shallow and well drained and are on uplands. They formed in residuum derived from hard limestone. The San German soils are mainly used for pasture. Slopes range from 5 to 60 percent.

San German soils are associated with Soller, Santa Clara, and Tanama soils. The San German soils are coarser textured and shallower than the Soller or Santa Clara soils. They are coarser textured and darker than the Tanama soils and do not have the argillic horizon typical of the Tanama soils.

Typical pedon of San German gravelly clay loam, 20 to 60 percent slopes, 630 meters west of kilometer marker 85.4 of Highway 10, in a field of pangolagrass:

A11—0 to 3 inches, very dark grayish brown (10YR 3/2) gravelly clay loam; weak fine granular structure; friable, slightly sticky, nonplastic; many fine roots; 50 percent limestone gravel; strongly alkaline; clear smooth boundary.

A12—3 to 10 inches, very dark brown (10YR 2/2) very gravelly clay loam; moderate medium granular structure; friable, slightly sticky, nonplastic; many fine roots; 50 percent limestone gravel; strongly alkaline; clear smooth boundary.

R—10 inches, hard limestone.

The depth to hard limestone ranges from 5 to 14 inches.

The content of the limestone gravel in the A horizon ranges from 50 to 60 percent, by volume.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 or 3. It ranges from clay loam to loam. Structure is weak or moderate granular.

San Sebastian series

The soils of the San Sebastian series are clayey-skeletal, carbonatic, isohyperthermic Typic Tropudalfs. They are deep and well drained and are on uplands. They formed in gravelly, fine textured residuum from limestone. The San Sebastian soils are mainly used for pasture. Slopes range from 20 to 60 percent.

San Sebastian soils are associated with Tanama and San German soils. The San Sebastian soils are deeper and finer textured than the San German soils and deeper and have more coarse fragments than the Tanama soils.

Typical pedon of San Sebastian gravelly clay, 20 to 60 percent slopes, 30 meters south of Highway 623, 630 meters from Highway 626:

Ap—0 to 6 inches, dark yellowish brown (10YR 4/4) gravelly clay; weak fine and medium subangular blocky structure; friable, slightly sticky, plastic; common fine roots; 30 percent gravel; strong effervescence, moderately alkaline; clear smooth boundary.

B21t—6 to 11 inches, strong brown (7.5YR 5/6) and dark yellowish brown (10YR 4/4) very gravelly clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; 50 percent gravel; strong effervescence, moderately alkaline; clear smooth boundary.

B22t—11 to 22 inches, brownish yellow (10YR 6/6) very gravelly clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; thin patchy clay films; 50 percent gravel; strong effervescence, moderately alkaline; gradual wavy boundary.

B3—22 to 31 inches, brownish yellow (10YR 6/6) and yellowish red (5YR 5/8) very gravelly clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; 50 percent gravel; strong

effervescence, moderately alkaline; gradual wavy boundary.
C—31 to 55 inches, brownish yellow (10YR 6/8) and yellowish red (5YR 4/6) very gravelly clay; massive; firm, slightly sticky, plastic; 50 percent gravel; strong effervescence, moderately alkaline.

The thickness of the solum ranges from 22 to 34 inches.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. The content of gravel ranges from 15 to 30 percent, by volume.

The B horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 4 to 8. Structure is weak fine or medium subangular blocky. The content of gravel ranges from 50 to 60 percent, by volume.

Santa Clara series

The soils of the Santa Clara series are fine, mixed, isohyperthermic Typic Eutropepts. They are moderately deep and well drained and are on uplands. They formed in fine textured residuum from limestone. The Santa Clara soils are mainly used for pasture. Some areas are in food crops. Slopes range from 2 to 12 percent.

Santa Clara soils are associated with Soller, San German, and Tanama soils. The Santa Clara soils have a thicker solum than the Soller soils, are finer textured and deeper than the San German soils, and are deeper than and do not have the argillic horizon typical of the Tanama soils.

Typical pedon of Santa Clara clay, 2 to 12 percent slopes, 25 meters north of a dirt road, 2 kilometers southwest of the intersection of Highway 652 and Highway 10, in a field of pangolagrass:

Ap—0 to 9 inches, very dark grayish brown (10YR 3/2) clay; moderate fine and medium granular structure; firm, slightly sticky, plastic; many fine roots; few fine black concretions; evidence of earthworm activity; slightly acid; clear smooth boundary.
B1—9 to 14 inches, dark yellowish brown (10YR 4/4) and very dark grayish brown (10YR 3/2) silty clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; many fine black concretions; neutral; clear smooth boundary.
B2—14 to 25 inches, yellowish brown (10YR 5/6) silty clay; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; common fine black concretions; 5 percent limestone fragments; slight effervescence, moderately alkaline; gradual smooth boundary.
C1—25 to 33 inches, yellowish brown (10YR 5/6) silty clay; massive; firm, slightly sticky, plastic; common fine black concretions; 15 percent limestone fragments; slight effervescence, moderately alkaline.
R—33 inches, hard fragmental limestone.

The thickness of the solum ranges from 20 to 30 inches. The depth to hard fragmental limestone ranges from 26 to 40 inches. The soil is silty clay or clay throughout.

The A horizon has hue of 10YR or 7.5YR and value and chroma of 2 or 3. Reaction ranges from slightly acid to mildly alkaline.

The B horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. Structure is moderate or weak subangular blocky. The content of limestone fragments ranges from 5 to 15 percent. Reaction ranges from neutral to moderately alkaline.

Soller series

The soils of the Soller series are clayey, mixed, isohyperthermic, shallow Typic Rendolls. They are moderately deep and well drained and are on uplands. They formed in fine textured residuum derived from limestone. The Soller soils are mainly used for pasture. Some areas are in sugarcane and food crops. Slopes range from 5 to 60 percent.

Soller soils are associated with Colinas, Naranjo, Juncal, and Santa Clara soils. The Soller soils are finer textured and are underlain by harder limestone than the Colinas soils. They are shallower than the Naranjo soils, are shallower than and do not have the argillic horizon typical of the Juncal soils, and have a thinner solum than the Santa Clara soils.

Typical pedon of Soller clay, 20 to 60 percent slopes, 0.9 kilometer south of kilometer marker 16.4 of Highway 129, in a field of native pasture:

Ap—0 to 5 inches, very dark gray (10YR 3/1) clay; weak fine subangular blocky structure; firm, slightly sticky, plastic; many fine roots; neutral; clear smooth boundary.
B2—5 to 10 inches, very dark grayish brown (10YR 3/2) and dark brown (10YR 4/3) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; neutral; gradual smooth boundary.
C—10 to 25 inches, dark brown (10YR 4/3) and very pale brown (10YR 7/4) clay; massive; firm, slightly sticky, plastic; moderately alkaline.
R—25 inches, hard fragmental limestone.

The thickness of the solum ranges from 10 to 14 inches. The depth to hard fragmental limestone ranges from 23 to 32 inches. In some pedons, the surface layer is 25 percent cobblestones. Reaction ranges from neutral to moderately alkaline.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. Structure is weak fine medium subangular blocky.

The B horizon has hue of 10YR, value of 3 or 4, and chroma of 2 to 4.

Tanama series

The soils of the Tanama series are clayey, mixed, isohyperthermic Lithic Tropudalfs. They are shallow and well drained and are on uplands. They formed in fine textured residuum derived from hard limestone. The Tanama soils are mainly used for pasture and woodland. Slopes range from 2 to 60 percent.

Tanama soils are associated with San Sebastian and San German soils. The Tanama soils have fewer coarse fragments and are shallower than the San Sebastian soils. The Tanama soils are finer textured than the San German soils, are lighter colored, and have an argillic horizon that is not typical of the San German soils.

Typical pedon of Tanama clay, 12 to 20 percent slopes, eroded, 2 kilometers east of kilometer marker 4.3 of Highway 667, in a field of native pasture and brush:

Ap—0 to 5 inches, dark reddish brown (5YR 3/4) clay; moderate fine and medium granular structure; firm, slightly sticky, plastic; many fine roots; few fine and medium limestone fragments; slightly acid; clear smooth boundary.

B21—5 to 10 inches, dark reddish brown (5YR 3/4) and yellowish red (5YR 4/6) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; few fine and medium limestone fragments; slightly acid; gradual wavy boundary.

B22t—10 to 16 inches, yellowish red (5YR 4/6) clay; moderate fine subangular blocky structure; firm, slightly sticky, plastic; common limestone fragments; neutral; clear smooth boundary.

R—16 inches, hard limestone.

The thickness of the solum and depth to the hard limestone range from 12 to 20 inches. Reaction is slightly acid or neutral.

The A horizon has hue of 5YR or 7.5YR, value of 3 or 4, and chroma of 4.

The B horizon has hue of 5YR or 2.5YR, value of 3 or 4, and chroma of 4 to 6. Structure ranges from moderate medium to moderate fine subangular blocky.

Tiburones series

The soils of the Tiburones series are euic, isohyperthermic Typic Troposaprists. They are deep and poorly drained and are on coastal plains and on flood plains. They formed in residuum of highly decomposed plant tissue. The Tiburones soils are mainly used for pasture and sugarcane. Slopes range from 0 to 2 percent.

Tiburones soils are associated with Garrochales, Jareales, Palmar, and Vigia soils. The Tiburones soils do not have the marly layers typical of the Garrochales soils or the mineral layers typical of the Jareales and Vigia soils. The Tiburones soils are more acid than the Palmar soils.

Typical pedon of Tiburones muck, 2.1 kilometers east of kilometer marker 10.7 of Highway 682, in an abandoned sugarcane field:

Oap—0 to 9 inches, black (N 2/0) broken face and rubbed muck; less than 5 percent fiber; moderate medium granular structure; friable, slightly sticky, slightly plastic; many fine and medium roots; low mineral content; medium acid; clear wavy boundary.

Oa2—9 to 15 inches, black (N 2/0) broken face and rubbed muck; less than 5 percent fiber; weak coarse prismatic and moderate medium platy structure; friable, slightly sticky, slightly plastic; common fine and medium roots; low mineral content; some roots have white fungi; extremely acid; gradual wavy boundary.

Oa3—15 to 31 inches, black (N 2/0) broken face and rubbed muck; less than 5 percent fiber; massive; friable, slightly sticky, slightly plastic; common fine roots; low mineral content; very strongly acid; clear smooth boundary.

Oa4—31 to 42 inches, 90 percent black (N 2/0) and 10 percent very dark brown (10YR 2/2) muck; less than 5 percent fiber; massive; friable, slightly sticky, slightly plastic; low mineral content; slightly acid; gradual smooth boundary.

Oa5—42 to 84 inches, very dark brown (10YR 2/2) broken face and rubbed muck; less than 5 percent fiber; massive; friable, slightly sticky, slightly plastic; low mineral content; neutral.

The thickness of the sapric horizon is more than 7 feet. Reaction ranges from extremely acid to medium acid in the upper part and slightly acid to neutral in the lower part. The fiber content is less than 5 percent throughout.

The Oap horizon has weak or moderate medium granular structure. The Oa2 horizon has weak or moderate coarse prismatic or platy structure. The lower Oa horizon has hue of 10YR, value of 2, and chroma of 2 or less.

Toa series

The soils of the Toa series are fine, mixed, isohyperthermic Fluventic Hapludolls. They are deep and well drained and are on flood plains. They formed in fine textured and moderately fine textured stratified alluvial sediments of mixed origin. The Toa soils are mainly used for sugarcane. Some areas are in pasture and food crops. Slopes range from 0 to 2 percent.

Toa soils are associated with Reilly, Bajura, Coloso, and Vivi soils. The Toa soils have a thicker solum and are finer textured than the Reilly or Vivi soils and are coarser textured and better drained than the Bajura or Coloso soils.

Typical pedon of Toa silty clay loam, 0.8 kilometer east of kilometer marker 85.2 of Highway 10, in a field of pangolagrass:

Ap—0 to 8 inches, dark brown (10YR 3/3) silty clay loam; moderate fine granular structure; firm, slightly sticky, plastic; many fine roots; common fine pores; neutral; clear smooth boundary.

A12—8 to 18 inches, dark brown (10YR 3/3) silty clay loam; weak fine subangular blocky structure parting to moderate fine granular; firm, slightly sticky, plastic; common fine roots; common fine pores; neutral; clear smooth boundary.

B—18 to 33 inches, brown (10YR 4/3) silty clay loam; few fine faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; firm, slightly sticky, plastic; few fine roots; common fine pores; common fine shiny flakes; neutral; clear smooth boundary.

C1—33 to 47 inches, dark yellowish brown (10YR 4/4) silty clay loam; few fine faint dark grayish brown (10YR 4/2) mottles; massive; friable, slightly sticky, plastic; few fine roots; many fine pores; many fine shiny flakes; neutral; gradual smooth boundary.

C2—47 to 63 inches, dark brown (7.5YR 4/4) silty clay loam; few fine faint light brownish gray (10YR 6/2) mottles and few faint brown (10YR 5/3) mottles; massive; friable, slightly sticky, plastic; many fine pores; many shiny flakes; neutral.

The thickness of the solum ranges from 24 to 35 inches. The thickness of the mollic epipedon ranges from 12 to 19 inches.

The A horizon has hue of 10YR and value and chroma of 2 to 3. Reaction ranges from strongly acid to neutral.

The B horizon has hue of 10YR, value of 4, and chroma of 3 or 4. Reaction ranges from neutral to mildly alkaline. Structure is weak fine or medium subangular blocky.

The C horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4. It is clay loam or silty clay loam.

Tropopsamments

Tropopsamments are deep, excessively drained soils. They formed in sandy sediments of mineral grains and shell fragments that have been subject to wind and wave action. Slopes range from 5 to 12 percent.

Tropopsamments are associated with Catano and Carrizales soils. Tropopsamments are at a higher position on the landscape than the Catano or Carrizales soils; the Catano and Carrizales soils have not been reworked by the wind and have distinct horizon development.

Because of the variability in depth, content, and texture, a typical pedon of Tropopsamments is not given.

The thickness of the sandy material is more than 60 inches. Reaction of the soils ranges from slightly acid to moderately alkaline.

The surface layer has hue of 10YR and 2.5Y, value of 6 or 7, and chroma of 2 or 3. It ranges from coarse sand to fine sand.

The subsurface layers have hue of 10YR and 2.5Y, value of 7 or 8, and chroma of 1 or 2. They are sandy.

Vega Alta series

The soils of the Vega Alta series are clayey, mixed, isohyperthermic Plinthic Paleudults. They are deep and well drained and are on the coastal plain. They formed in fine textured clay and plinthite. The Vega Alta soils are mainly used for pangolagrass, sugarcane, pineapples, and food crops. Slopes range from 2 to 12 percent.

Vega Alta soils are associated with Espinosa, Almirante, Sabana Seca, Vega Baja, and Bayamon soils. The Vega Alta soils have plinthite layers, are not characteristic of the Espinosa or Bayamon soils, and are shallower to plinthite than the Almirante soils. The Vega Alta soils are better drained than the Sabana Seca or Vega Baja soils.

Typical pedon of Vega Alta clay, 2 to 5 percent slopes, 1.8 kilometers east of kilometer marker 71.8 of Highway 2, in a field of native pasture:

Ap—0 to 8 inches, dark brown (10YR 4/3) clay; weak medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; fine black concretions; very strongly acid; clear smooth boundary.

B21t—8 to 16 inches, yellowish brown (10YR 5/6) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; many black stains; few fine black concretions; very strongly acid; clear wavy boundary.

B22t—16 to 27 inches, yellowish brown (10YR 5/6), light gray (10YR 7/1), and red (10YR 4/6) clay; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; thin patchy clay films; few fine black concretions; 6 percent plinthite by volume; extremely acid; gradual wavy boundary.

B23t—27 to 35 inches, yellowish brown (10YR 5/6), red (10YR 4/6), and light gray (10YR 7/1) clay; moderate medium blocky structure; firm, sticky, plastic; thin patchy clay films; 10 percent plinthite by volume; extremely acid; gradual wavy boundary.

B24t—35 to 48 inches, light gray (10YR 7/1) yellowish brown (10YR 5/6), and red (10R 4/6) clay; weak medium subangular blocky structure; firm, sticky, plastic; 15 percent plinthite by volume; extremely acid; gradual wavy boundary.

B25t—48 to 70 inches, light gray (10YR 7/1), brownish yellow (10YR 6/6), yellowish brown (10YR 5/6), and red (10R 4/6) clay; weak coarse subangular blocky

structure; firm, sticky, plastic; 10 percent plinthite by volume; extremely acid.

The thickness of the solum is more than 60 inches. The depth to plinthite is less than 20 inches. Reaction ranges from strongly acid to extremely acid throughout.

The Ap horizon has hue of 10YR or 7.5YR and value and chroma of 3 or 4. It ranges from sandy clay loam to clay.

The B horizon is variegated yellowish brown, brownish yellow, red, and light gray in varying proportions. Structure of the B2t horizon ranges from weak to moderate and from fine to coarse subangular blocky. Clay films range from thin to thick patchy. The plinthite content ranges from 6 to 20 percent or more, by volume.

Vega Baja series

The soils of the Vega Baja series are fine, mixed, isohyperthermic Aeric Tropaqualfs. They are deep and somewhat poorly drained and are on the coastal plains. They formed in alluvial sediments over fine textured material. The Vega Baja soils are used for sugarcane and pasture. Slopes range from 2 to 5 percent.

The Vega Baja soils are associated with Bajura, Sabana Seca, Vega Alta, and Coloso soils. The Vega Baja soils are better drained than and do not have the pressure faces typical of the Bajura soils; do not have the plinthite layers typical of the Sabana Seca and Vega Alta soils; and have an argillic horizon, which is not typical of the Coloso soils.

Typical pedon of Vega Baja clay, 2 to 5 percent slopes, 15 meters west of kilometer marker 15.3 of Highway 686, in a sugarcane field:

Ap—0 to 8 inches, very dark grayish brown (10YR 3/2) clay; moderate fine and medium granular structure; firm, slightly sticky, plastic; many fine roots; strongly acid; clear smooth boundary.

A12—8 to 17 inches, very dark grayish brown (10YR 3/2) clay; dark reddish brown (5YR 3/4) mottles; moderate medium subangular blocky structure; very firm, slightly sticky, plastic; common fine roots; mildly alkaline; clear smooth boundary.

B21t—17 to 24 inches, yellowish brown (10YR 5/8), dark brown (10YR 3/2), and gray (10YR 5/1) clay; weak coarse and medium subangular blocky structure; very firm, slightly sticky, plastic; few fine roots; neutral; clear wavy boundary.

B22t—24 to 34 inches, yellowish brown (10YR 5/6) and gray (5Y 6/1) clay; weak coarse subangular blocky structure; firm, slightly sticky, plastic; few fine roots; neutral; clear smooth boundary.

B23t—34 to 48 inches, yellowish brown (10YR 5/8) clay; light olive gray (5Y 6/2) mottles; weak medium and coarse subangular blocky structure; firm, slightly sticky, plastic; few fine roots; neutral; gradual wavy boundary.

C1—48 to 60 inches, light olive gray (5Y 6/2) clay; yellowish brown (10YR 5/8) and red (2.5YR 4/8) mottles; massive; firm, sticky, plastic; neutral; gradual wavy boundary.

C2—60 to 70 inches, light greenish gray (5GY 7/1) clay; bluish gray (5B 6/1), yellowish brown (10YR 5/8), and red (2.5YR 4/8) mottles; massive; firm, sticky, plastic; neutral.

The thickness of the solum ranges from 37 to 57 inches. Reaction ranges from strongly acid to neutral.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 to 4.

The B horizon has hue of 10YR, value of 5 or 6, and chroma of 1 to 8. Structure is weak coarse or medium subangular blocky.

The C horizon has hue of 5Y and 5GY, value of 6 or 7, and chroma of 1 or 2.

Vigia series

The soils of the Vigia series are fine, mixed, nonacid, isohyperthermic Histic Tropaquepts. They are deep and poorly drained and are on coastal plains and on flood plains. They formed in the residuum of highly decomposed plant tissue over fine textured sediments. The Vigia soils are mainly used for pasture. Some areas are in sugarcane. Slopes range from 0 to 2 percent.

Vigia soils are associated with Garrochales, Jareales, and Tiburones soils. The Vigia soils do not have the marly layers typical of the Garrochales soils and have a C horizon that is not characteristic of the Jareales or Tiburones soils.

Typical pedon of Vigia muck, 0.8 kilometer east of kilometer marker 3.6 of Highway 690, in a field of native pasture.

Oap—0 to 14 inches, black (N 2/0) broken face and rubbed muck 5 percent fiber; moderate fine granular structure; friable, slightly sticky, slightly plastic; many fine roots; low mineral content; strongly acid; clear smooth boundary.

Oa2—14 to 18 inches, 50 percent black (N 2/0) and 50 percent very dark brown (10YR 2/2) muck; moderate fine and medium subangular blocky structure; friable, slightly sticky, slightly plastic; common fine roots; 10 percent mineral content; medium acid; abrupt smooth boundary.

C1—18 to 27 inches, gray (10YR 5/1) clay; rust colored mottles from root decay; massive; firm, sticky, plastic; medium acid; clear smooth boundary.

C2—27 to 39 inches, yellowish brown (10YR 5/6) clay; few fine distinct yellowish red (5YR 4/6) mottles and common medium distinct light brownish gray (10YR 6/2) mottles; massive; firm, sticky, plastic; strongly acid; gradual wavy boundary.

C3—39 to 60 inches, reddish brown (5YR 5/4) clay; few fine distinct brownish yellow (10YR 6/8) and

greenish gray (5BG 6/1) mottles; massive; firm, sticky, plastic; slightly acid.

The depth to the mineral layers ranges from 14 to 20 inches. Reaction ranges from strongly acid to slightly acid.

The Oa layers have hue of 2.5Y, value of 2, and chroma of 1 or less. The fiber content is less than 5 percent.

The upper part of the C horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The lower part of the C horizon has hue of 10YR to 5YR and value and chroma of 4 to 6. It is mottled.

Vivi series

The soils of the Vivi series are coarse-loamy, mixed, isohyperthermic Fluventic Hapludolls. They are deep and somewhat excessively drained and are on flood plains. They formed in coarse textured and medium textured stratified alluvial sediments of mixed origin. The Vivi soils are mainly used for sugarcane. Some areas are in pasture. Slopes range from 0 to 2 percent.

Vivi soils are associated with Toa and Reilly soils and with Riverwash. The Vivi soils have a thinner solum and are coarser textured than the Toa soils, are deeper to sand than the Reilly soils, and are at a higher elevation on the flood plain than riverwash.

Typical pedon of Vivi loam, 270 meters east of kilometer marker 77.7 of Highway 10 in a field of sugarcane:

Ap—0 to 7 inches, dark brown (10YR 3/3) loam; weak fine and medium granular structure; friable, nonsticky, nonplastic; many fine roots; many fine shiny flakes; strongly acid; clear smooth boundary.

B—7 to 14 inches, dark yellowish brown (10YR 4/4) loam; weak fine and medium subangular blocky structure; friable, nonsticky, nonplastic; common fine roots; many shiny flakes; strongly acid; clear smooth boundary.

C1—14 to 20 inches, dark yellowish brown (10YR 4/4) loam; massive; friable, nonsticky, nonplastic; few fine roots; many shiny flakes; neutral; gradual smooth boundary.

C2—20 to 25 inches, dark yellowish brown (10YR 4/4) sandy loam; few fine rust and light gray mottles; massive; very friable, nonsticky, nonplastic; few fine roots; many shiny flakes; neutral; gradual smooth boundary.

C3—25 to 30 inches, dark yellowish brown (10YR 4/4) loamy sand; massive; very friable; nonsticky, nonplastic; many quartz and volcanic fragments; many shiny flakes; neutral; abrupt smooth boundary.

C4—30 to 60 inches, yellowish brown (10YR 5/4) sand; single grain; loose nonsticky, nonplastic; neutral.

The thickness of the solum ranges from 11 to 19 inches.

The A horizon has hue of 10YR and value and chroma of 2 or 3.

The B horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. It is loam or sandy loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It ranges from sandy loam to sand.

Voladora series

The soils of the Voladora series are clayey, oxidic, isohyperthermic Typic Rhodudults. They are deep and well drained and are on uplands. They formed in fine textured and moderately fine residuum from highly weathered conglomerate. The Voladora soils are used mainly for coffee, pasture, and food crops. Slopes range from 5 to 40 percent.

Voladora soils are associated with Moca and Perchas soils. The Voladora soils are better drained than either of the associated soils and have an argillic horizon that is not characteristic of the Perchas soils.

Typical pedon of Voladora clay, 5 to 12 percent slopes, eroded 400 meters southeast of kilometer marker 6.6 of Highway 145, in a field of pangolagrass.

Ap—0 to 8 inches, dark reddish brown (10YR 3/4) clay; moderate fine granular structure; firm, slightly sticky, plastic; many fine roots; few fine volcanic fragments; strongly acid; clear smooth boundary.

B21t—8 to 13 inches, red (2.5YR 3/6) and reddish brown (5YR 4/4) clay; moderate fine and medium subangular blocky structure; firm, slightly sticky, plastic; many fine roots; thin patchy clay films; few fine volcanic fragments; very strongly acid; clear smooth boundary.

B22t—13 to 21 inches, dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; thin patchy clay films; extremely acid; gradual smooth boundary.

B23t—21 to 27 inches, dark red (2.5YR 3/6) clay; weak fine and medium subangular blocky structure; firm, slightly sticky, plastic; common fine roots; few patchy clay films; common fine volcanic fragments; extremely acid; gradual smooth boundary.

B3—27 to 33 inches, dark red (2.5YR 3/6 and 10R 3/6) and light brownish gray (2.5YR 6/2) clay; weak fine subangular blocky structure; firm, slightly sticky, plastic; few fine roots; 5 percent fine gravel; extremely acid; clear smooth boundary.

C—33 to 50 inches, red (10R 4/6), strong brown (7.5YR 5/8), yellowish brown (10YR 5/8), and light brownish gray (2.5YR 6/2) highly weathered clay loam saprolite from volcanic conglomerate; massive; friable, slightly sticky, plastic; extremely acid.

The thickness of the solum ranges from 25 to 40 inches. The thickness of the argillic horizon ranges from 19 to 30 inches. Reaction ranges from strongly acid to extremely acid.

The A horizon has hue of 5YR or 2.5YR, value of 3, and chroma of 3 or 4.

The B horizon has hue of 2.5YR or 10R, value of 3 or 4, and chroma of 4 to 8. Structure range varies from moderate to weak and from fine to medium subangular blocky.

The C horizon is silty clay loam or clay loam.

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(3) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. [Supplements replacing pp. 173-188 issued May 1962]

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glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.
Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.
Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.
Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.
Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.5 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:
O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.
A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.
B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.
C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.
R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The

slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to insure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 mm in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:

	Millimeters
Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION AT ARECIBO, P.R.

[Recorded in the period 1951-75]

Month	Temperature						Precipitation			
				2 years in 10 will have--				2 years in 10 will have--		
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days[1]	Average	Less than--	More than--	Average number of days with 0.10 inch or more
	°F	°F	°F	°F	°F	Units	In	In	In	
January	84.1	64.8	74.5	90	60	450	4.42	2.53	5.96	8
February	84.1	64.3	74.2	90	60	398	2.69	1.16	3.93	5
March	85.5	65.0	75.3	91	61	474	2.46	.77	3.81	5
April	86.6	66.6	76.6	92	61	498	4.45	2.12	6.34	8
May	88.4	68.7	78.5	94	64	574	5.10	2.52	7.20	9
June	89.7	70.0	79.9	94	66	597	4.29	2.55	5.83	8
July	89.9	70.6	80.3	94	67	629	3.75	2.30	5.04	8
August	90.2	70.9	80.6	95	67	639	4.10	2.89	5.21	8
September	90.0	70.7	80.4	94	67	612	4.85	3.14	6.38	9
October	89.3	69.9	79.6	93	65	608	5.03	3.03	6.82	10
November	87.4	68.5	78.0	92	64	540	6.13	3.33	8.41	10
December	85.0	66.5	75.8	90	62	490	6.80	2.95	9.93	11
Year	87.5	68.0	77.8	96	59	6,509	54.07	45.71	62.07	99

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (60° F).

TABLE 2.--TEMPERATURE AND PRECIPITATION AT ADJUNTAS, P.R.

[Recorded in the period 1970-74]

Month	Temperature						Precipitation			
				2 years in 10 will have--				2 years in 10 will have--		
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days[1]	Average	Less than--	More than--	Average number of days with 0.10 inch or more
	°F	°F	°F	°F	°F	Units	In	In	In	
January----	78.5	54.7	66.6	83	46	205	3.32	1.25	4.97	5
February---	79.2	53.7	66.5	83	45	182	2.61	1.11	3.82	4
March------	79.9	54.3	67.1	85	47	220	4.01	1.38	6.11	7
April------	80.9	56.1	68.5	86	49	255	4.41	2.13	6.26	6
May--------	81.9	59.4	70.6	87	50	329	3.88	1.63	5.70	7
June-------	83.5	61.3	72.4	89	55	372	5.47	2.61	7.80	8
July-------	84.0	60.4	72.2	89	55	378	6.16	3.09	8.65	9
August-----	83.9	61.5	72.7	88	54	394	7.61	6.62	8.56	14
September--	83.8	61.0	72.4	88	56	372	12.12	7.65	16.16	14
October----	82.4	61.0	71.7	88	55	363	11.54	8.30	14.53	15
November---	81.1	58.7	69.9	85	51	297	6.64	4.70	8.43	10
December---	77.9	57.0	67.5	84	47	233	3.43	2.38	4.40	8
Year-----	81.4	58.3	69.8	90	45	3,600	71.20	65.67	76.61	107

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (60° F).

TABLE 3.--PRECIPITATION AT ADJUNTAS 1 NW, P.R.

[Recorded in the period 1951-75]

Month	Precipitation			
	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more
		Less than--	More than--	
	In	In	In	
January----	2.79	1.70	3.76	5
February---	2.23	1.05	3.18	5
March------	3.38	1.09	5.20	6
April------	6.35	2.72	9.29	8
May--------	7.61	2.82	11.46	8
June-------	6.85	3.89	9.25	8
July-------	7.23	4.57	9.62	9
August-----	11.12	7.76	14.21	12
September--	12.45	8.03	16.44	12
October----	11.01	6.56	14.99	12
November---	8.27	5.33	10.93	9
December---	3.84	1.94	5.38	6
Year-----	83.13	71.16	93.80	100

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
AaC	Aceitunas sandy clay loam, 5 to 12 percent slopes	42	*
AcC	Aceitunas clay, 5 to 12 percent slopes	131	*
AdF2	Adjuntas clay, 40 to 60 percent slopes, eroded	1,826	0.5
AgC	Algarrobo fine sand, 2 to 12 percent slopes	1,996	0.5
AlB	Almirante sandy loam, 2 to 5 percent slopes	1,736	0.4
AlC	Almirante sandy loam, 5 to 12 percent slopes	2,081	0.5
AmB	Almirante sandy clay loam, 2 to 5 percent slopes	398	0.1
AmC	Almirante sandy clay loam, 5 to 12 percent slopes	894	0.2
AnB	Almirante clay, 2 to 5 percent slopes	4,876	1.2
AnC	Almirante clay, 5 to 12 percent slopes	4,475	1.1
AoD2	Alonso clay, 12 to 20 percent slopes, eroded	165	*
AoE2	Alonso clay, 20 to 40 percent slopes, eroded	1,034	0.3
AoF2	Alonso clay, 40 to 60 percent slopes, eroded	2,923	0.7
ArC	Arecibo fine sand, 2 to 12 percent slopes	507	0.1
Ba	Bajura clay	3,165	0.8
BcB	Bayamon sandy loam, 2 to 5 percent slopes	829	0.2
BcC	Bayamon sandy loam, 5 to 12 percent slopes	4,162	1.0
BsB	Bayamon sandy clay loam, 2 to 5 percent slopes	1,027	0.3
BsC	Bayamon sandy clay loam, 5 to 12 percent slopes	4,329	1.1
ByB	Bayamon clay, 2 to 5 percent slopes	9,942	2.5
ByC	Bayamon clay, 5 to 12 percent slopes	2,116	0.5
CaF	Caguabo clay loam, 20 to 60 percent slopes	1,177	0.3
CbF	Caguabo-Rock outcrop complex, 20 to 60 percent slopes	2,090	0.5
CcD	Caracoles loam, 5 to 20 percent slopes	569	0.1
CcE	Caracoles loam, 20 to 40 percent slopes	466	0.1
CeC	Carrizales fine sand, 2 to 12 percent slopes	2,657	0.7
Cf	Catano sand	681	0.2
Cg	Coastal beaches	269	0.1
ClD2	Colinas clay loam, 12 to 20 percent slopes, eroded	1,006	0.3
ClE2	Colinas clay loam, 20 to 40 percent slopes, eroded	2,553	0.6
ClF2	Colinas clay loam, 40 to 60 percent slopes, eroded	6,302	1.6
CmF2	Colinas cobbly clay loam, 20 to 60 percent slopes, eroded	6,701	1.7
Cn	Coloso silty clay	5,911	1.5
CoE	Consejo clay, 20 to 40 percent slopes	174	*
CoF	Consejo clay, 40 to 60 percent slopes	2,207	0.5
CpE	Consumo clay, 20 to 40 percent slopes	126	*
CpF	Consumo clay, 40 to 60 percent slopes	2,908	0.7
CrC	Corozal clay, 5 to 12 percent slopes	565	0.1
CsC	Corozo fine sand, 2 to 12 percent slopes	1,815	0.5
CtB	Coto clay, 2 to 5 percent slopes	35	*
CtC	Coto clay, 5 to 12 percent slopes	9	*
CuF	Cuchillas silty clay loam, 40 to 60 percent slopes	608	0.2
CvF	Cuchillas-Rock outcrop complex, 40 to 60 percent slopes	1,229	0.3
DaD2	Daguey clay, 12 to 20 percent slopes, eroded	1,224	0.3
EaB	Espinosa sandy loam, 2 to 5 percent slopes	571	0.1
EaC	Espinosa sandy loam, 5 to 12 percent slopes	1,101	0.3
EbB	Espinosa sandy clay loam, 2 to 5 percent slopes	484	0.1
EbC	Espinosa sandy clay loam, 5 to 12 percent slopes	599	0.1
EcB	Espinosa clay, 2 to 5 percent slopes	3,679	0.9
EcC	Espinosa clay, 5 to 12 percent slopes	1,500	0.4
Ga	Garrochales muck	402	0.1
GeC	Guerrero sand, 2 to 12 percent slopes	3,439	0.9
HD	Hydraquents, frequently flooded	949	0.2
HmE	Humatas clay, 20 to 40 percent slopes	2,600	0.6
HmF	Humatas clay, 40 to 60 percent slopes	23,171	5.8
HS	Hydraquents, saline	323	0.1
InD	Ingenio clay loam, 5 to 20 percent slopes	2,111	0.5
InE	Ingenio clay loam, 20 to 40 percent slopes	393	0.1
IsC	Islote sandy clay loam, 2 to 12 percent slopes	857	0.2
Ja	Jareales clay	1,850	0.5
JoC	Jobos sandy loam, 2 to 12 percent slopes	2,591	0.6
JuD2	Juncal clay, 12 to 20 percent slopes, eroded	2,207	0.5
JuE2	Juncal clay, 20 to 40 percent slopes, eroded	144	*
LcE2	Lirios clay loam, 20 to 40 percent slopes, eroded	821	0.2
LcF2	Lirios clay loam, 40 to 60 percent slopes, eroded	13,976	3.5
LgD	Los Guineos clay, 12 to 20 percent slopes	880	0.2
LgE	Los Guineos clay, 20 to 40 percent slopes	2,627	0.7
LgF	Los Guineos clay, 40 to 60 percent slopes	8,676	2.2
LME	Los Guineos-Maricao-Rock outcrop association, steep	5,731	1.4
MaF2	Maraguez silty clay loam, 40 to 60 percent slopes, eroded	6,212	1.5

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
McF	Maricao clay, 40 to 60 percent slopes	835	0.2
MmF	Matanzas-Rock outcrop complex, 5 to 60 percent slopes	838	0.2
MnB	Matanzas clay, 2 to 5 percent slopes	646	0.2
MoC2	Moca clay, 2 to 12 percent slopes, eroded	1,957	0.5
MoD2	Moca clay, 12 to 20 percent slopes, eroded	2,447	0.6
MoE2	Moca clay, 20 to 40 percent slopes, eroded	413	0.1
MpF2	Morado clay loam, 40 to 60 percent slopes, eroded	8,126	2.0
MuE	Mucara clay, 20 to 40 percent slopes	164	*
MuF	Mucara clay, 40 to 60 percent slopes	13,476	3.3
NaD	Naranjo clay, 5 to 20 percent slopes	1,488	0.4
NaE	Naranjo clay, 20 to 40 percent slopes	1,592	0.4
NaF	Naranjo clay, 40 to 60 percent slopes	419	0.1
Pa	Palmar muck	966	0.2
PeF	Pellejas clay loam, 40 to 60 percent slopes	23,282	5.8
PhC2	Perchas clay, 2 to 12 percent slopes, eroded	1,122	0.3
PhD2	Perchas clay, 12 to 20 percent slopes, eroded	1,458	0.4
Ps	Pits, gravel	446	0.1
Pt	Pits, sand	674	0.2
Re	Reilly gravelly silt loam	1,175	0.3
RlC	Rio Lajas sand, 2 to 12 percent slopes	873	0.2
Rm	Riverwash	513	0.1
Ro	Rock outcrop, limestone	571	0.1
Rr	Rock outcrop, sandstone	162	*
RsF	Rock outcrop-San German complex, 20 to 60 percent slopes	2,760	0.7
RtF	Rock outcrop-Tanama complex, 12 to 60 percent slopes	57,617	14.3
SaB	Sabana Seca clay, 2 to 5 percent slopes	1,300	0.3
SgD	San German gravelly clay loam, 5 to 20 percent slopes	2,521	0.6
SgF	San German gravelly clay loam, 20 to 60 percent slopes	2,869	0.7
SmF	San Sebastian gravelly clay, 20 to 60 percent slopes	23,095	5.7
SnC	Santa Clara clay, 2 to 12 percent slopes	1,227	0.3
SoC	Soller clay, 5 to 12 percent slopes	639	0.2
SoD	Soller clay, 12 to 20 percent slopes	2,473	0.6
SoF	Soller clay, 20 to 60 percent slopes	4,153	1.0
SpD	Soller cobbly clay, 12 to 20 percent slopes	1,224	0.3
SpF	Soller cobbly clay, 20 to 60 percent slopes	525	0.1
SrF	Soller-Rock outcrop complex, 5 to 60 percent slopes	30,035	7.5
TaB	Tanama clay, 2 to 5 percent slopes	276	0.1
TaC2	Tanama clay, 5 to 12 percent slopes, eroded	1,849	0.5
TaD2	Tanama clay, 12 to 20 percent slopes, eroded	1,853	0.5
Tb	Tiburones muck	3,344	0.8
To	Toa silty clay loam	6,180	1.5
TP	Tropopsamments, hummocky	419	0.1
Ur	Urban land	4,425	1.1
VaB	Vega Alta sandy clay loam, 2 to 5 percent slopes	190	*
VaC2	Vega Alta sandy clay loam, 5 to 12 percent slopes, eroded	600	0.1
VcB	Vega Alta clay, 2 to 5 percent slopes	1,448	0.4
VcC2	Vega Alta clay, 5 to 12 percent slopes, eroded	2,294	0.6
VeB	Vega Baja clay, 2 to 5 percent slopes	1,623	0.4
Vg	Vigia muck	1,551	0.4
Vm	Vivi loam	2,590	0.6
VoC2	Voladora clay, 5 to 12 percent slopes, eroded	800	0.2
VoD2	Voladora clay, 12 to 20 percent slopes, eroded	143	*
VoE2	Voladora clay, 20 to 40 percent slopes, eroded	888	0.2
	Total	402,384	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those than can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Plantains	Bananas	Taniers	Pineapple	Coffee
	Thousand	Cwt	Cwt	Ton	Cwt
AaC, AcC---- Aceitunas	25	---	50	18	---
AdF2---- Adjuntas	---	---	---	---	---
AgC---- Algarrobo	---	---	---	---	---
AlB---- Almirante	25	---	---	20	---
AlC---- Almirante	20	---	---	20	---
AmB---- Almirante	30	---	55	20	---
AmC---- Almirante	25	---	50	20	---
AnB---- Almirante	30	---	55	20	---
AnC---- Almirante	25	---	50	20	---
AoD2---- Alonso	30	50	80	---	12
AoE2---- Alonso	25	40	60	---	10
AoF2---- Alonso	---	---	---	---	4
ArC---- Arecibo	---	---	---	---	---
Ba---- Bajura	---	---	---	---	---
BcB---- Bayamon	25	---	---	20	---
BcC---- Bayamon	20	---	---	20	---
BsB---- Bayamon	30	---	55	20	---
BsC---- Bayamon	25	---	50	20	---
ByB---- Bayamon	30	---	55	20	---
ByC---- Bayamon	25	---	50	20	---
CaF---- Caguabo	---	---	---	---	---
CbF---- Caguabo-Rock outcrop	---	---	---	---	---

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Plantains	Bananas	Taniers	Pineapple	Coffee
	Thousand	Cwt	Cwt	Ton	Cwt
CcD, CcE---------- Caracoles	---	---	---	---	---
CeC---------- Carrizales	---	---	---	---	---
Cf---------- Catano	---	---	---	---	---
Cg*---------- Coastal beaches	---	---	---	---	---
ClD2---------- Colinas	---	---	---	---	---
ClE2---------- Colinas	---	---	---	---	---
ClF2, CmF2---------- Colinas	---	---	---	---	---
Cn---------- Coloso	---	---	---	---	---
CoE, CoF---------- Consejo	25	40	---	---	10
CpE---------- Consumo	20	40	50	---	8
CpF---------- Consumo	---	---	---	---	---
CrC---------- Corozal	30	50	80	16	12
CsC---------- Corozo	---	---	---	---	---
CtB---------- Coto	30	---	55	20	---
CtC---------- Coto	25	---	50	20	---
CuF---------- Cuchillas	---	---	---	---	---
CvF---------- Cuchillas-Rock outcrop	---	---	---	---	---
DaD2---------- Daguey	30	50	80	---	12
EaB---------- Espinosa	25	---	---	20	---
EaC---------- Espinosa	20	---	---	20	---
EbB, EbC---------- Espinosa	25	---	50	20	---
EcB---------- Espinosa	30	---	55	20	---
EcC---------- Espinosa	25	---	50	20	---

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Plantains	Bananas	Taniers	Pineapple	Coffee
	Thousand	Cwt	Cwt	Ton	Cwt
Ga---------- Garrochales	---	---	---	---	---
GeC---------- Guerrero	---	---	---	---	---
HD*---------- Hydraquents	---	---	---	---	---
HmE---------- Humatas	25	40	60	---	10
HmF---------- Humatas	---	---	---	---	4
HS*---------- Hydraquents	---	---	---	---	---
InD, InE---------- Ingenio	25	50	70	---	10
IsC---------- Islote	---	---	---	---	---
Ja---------- Jareales	---	---	---	---	---
JoC---------- Jobos	---	---	---	---	---
JuD2, JuE2---------- Juncal	25	40	70	---	---
LcE2---------- Lirios	20	30	60	---	8
LcF2---------- Lirios	---	---	---	---	4
LgD---------- Los Guineos	18	50	80	---	10
LgE---------- Los Guineos	18	40	60	---	8
LgF---------- Los Guineos	---	---	---	---	4
LME*:					
Los Guineos----------	---	---	---	---	4
Maricao----------	---	---	---	---	---
Rock outcrop----------	---	---	---	---	---
MaF2---------- Maraguez	---	---	---	---	---
McF---------- Maricao	---	---	---	---	---
MmF---------- Matanzas-Rock outcrop	---	---	---	---	---
MnB---------- Matanzas	30	---	50	18	---

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Plantains	Bananas	Taniers	Pineapple	Coffee
	Thousand	Cwt	Cwt	Ton	Cwt
MoC2---------- Moca	20	---	80	---	---
MoD2---------- Moca	20	---	70	---	---
MoE2---------- Moca	---	---	60	---	---
MpF2---------- Morado	---	---	---	---	---
MuE---------- Mucara	25	40	60	---	10
MuF---------- Mucara	---	---	---	---	---
NaD, NaE, NaF---------- Naranjo	18	30	50	---	---
Pa---------- Palmar	---	---	---	---	---
PeF---------- Pellejas	---	---	---	---	---
PhC2, PhD2---------- Perchas	---	---	60	---	---
Ps*, Pt*. Pits					
Re---------- Reilly	---	---	---	---	---
RlC---------- Rio Lajas	---	---	---	---	---
Rm*---------- Riverwash	---	---	---	---	---
Ro*, Rr*---------- Rock outcrop	---	---	---	---	---
RsF---------- Rock outcrop-San German	---	---	---	---	---
RtF---------- Rock outcrop-Tanama	---	---	---	---	---
SaB---------- Sabana Seca	---	---	---	---	---
SgD---------- San German	---	---	---	---	---
SgF---------- San German	---	---	---	---	---
SmF---------- San Sebastian	---	---	---	---	---
SnC---------- Santa Clara	20	30	50	---	---
SoC---------- Soller	---	---	80	---	---

See footnote at end of table.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Plantains	Bananas	Taniers	Pineapple	Coffee
	Thousand	Cwt	Cwt	Ton	Cwt
SoD---------- Soller	---	---	60	---	---
SoF---------- Soller	---	---	---	---	---
SpD---------- Soller	---	---	---	---	---
SpF---------- Soller	---	---	---	---	---
SrF---------- Soller-Rock outcrop	---	---	---	---	---
TaB---------- Tanama	---	---	---	---	---
TaC2---------- Tanama	---	---	---	---	---
TaD2---------- Tanama	---	---	---	---	---
Tb---------- Tiburones	---	---	---	---	---
To---------- Toa	35	60	80	---	---
TP*---------- Tropopsamments	---	---	---	---	---
Ur*---------- Urban land	---	---	---	---	---
VaB---------- Vega Alta	30	---	55	18	---
VaC2---------- Vega Alta	25	---	50	18	---
VcB---------- Vega Alta	30	---	55	18	---
VcC2---------- Vega Alta	25	---	50	18	---
VeB---------- Vega Baja	---	---	---	---	---
Vg---------- Vigia	---	---	---	---	---
Vm---------- Vivi	---	---	---	---	---
VoC2---------- Voladora	25	50	60	---	12
VoD2---------- Voladora	20	40	55	---	10
VoE2---------- Voladora	---	---	---	---	8

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Soil name and map symbol	Spring sugarcane	18-month sugarcane	Ratoon sugarcane	Merkergrass	Pangola-grass	Paragrass	Guinea-grass
	Ton	Ton	Ton	Ton	AUM*	AUM*	AUM*
AaC, AcC---------- Aceitunas	50	60	40	17	20	17	24
AdF2---------- Adjuntas	---	---	---	---	14	---	20
AgC---------- Algarrobo	---	---	---	12	10	---	12
AlB---------- Almirante	55	70	45	19	20	17	24
AlC---------- Almirante	50	60	40	17	---	17	24
AmB---------- Almirante	55	70	45	19	20	17	24
AmC---------- Almirante	50	60	40	17	20	17	24
AnB---------- Almirante	55	70	45	19	20	17	24
AnC---------- Almirante	50	60	40	17	20	17	24
AoD2---------- Alonso	50	60	40	17	17	---	20
AoE2---------- Alonso	40	55	35	15	17	---	20
AoF2---------- Alonso	---	---	---	---	14	---	---
ArC---------- Arecibo	---	---	---	12	10	---	12
Ba---------- Bajura	55	70	45	15	15	17	---
BcB---------- Bayamon	55	70	45	19	20	17	24
BcC---------- Bayamon	50	60	40	17	---	17	24
BsB---------- Bayamon	55	70	45	19	20	17	24
BsC---------- Bayamon	50	60	40	17	20	17	24
ByB---------- Bayamon	55	70	45	19	20	17	24
ByC---------- Bayamon	50	60	40	17	20	17	24
CaF---------- Caguabo	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Spring sugarcane	18-month sugarcane	Ratoon sugarcane	Merkergrass	Pangola-grass	Paragrass	Guinea-grass
	Ton	Ton	Ton	Ton	AUM*	AUM*	AUM*
CbF---------- Caguabo-Rock outcrop	---	---	---	---	---	---	---
CcD, CcE---------- Caracoles	---	---	---	---	---	---	10
CeC---------- Carrizales	---	---	---	12	10	---	12
Cf---------- Catano	---	---	---	12	10	---	12
Cg**---------- Coastal beaches	---	---	---	---	---	---	---
ClD2---------- Colinas	40	55	35	13	17	---	10
ClE2---------- Colinas	35	45	30	11	17	---	10
ClF2, CmF2---------- Colinas	---	---	---	---	---	---	---
Cn---------- Coloso	55	70	45	16	20	17	---
CoE, CoF---------- Consejo	40	55	35	---	17	---	20
CpE---------- Consumo	35	45	30	14	17	---	20
CpF---------- Consumo	---	---	---	---	14	---	---
CrC---------- Corozal	50	60	40	17	20	---	24
CsC---------- Corozo	---	---	---	12	10	---	12
CtB---------- Coto	55	70	45	19	20	17	24
CtC---------- Coto	50	60	40	17	20	17	24
CuF---------- Cuchillas	---	---	---	---	---	---	---
CvF---------- Cuchillas-Rock outcrop	---	---	---	---	---	---	---
DaD2---------- Daguey	50	60	40	15	20	---	24
EaB---------- Espinosa	55	70	45	19	20	17	24
EaC---------- Espinosa	50	60	40	17	---	17	24
EbB, EbC---------- Espinosa	50	60	40	18	20	17	24
EcB---------- Espinosa	55	70	45	19	20	17	24

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Spring sugarcane	18-month sugarcane	Ratoon sugarcane	Merkergrass	Pangola-grass	Paragrass	Guinea-grass
	Ton	Ton	Ton	Ton	AUM*	AUM*	AUM*
EcC---------- Espinosa	50	60	40	17	20	17	24
Ga---------- Garrochales	---	---	---	---	20	17	---
GeC---------- Guerrero	---	---	---	12	10	---	12
HD**---------- Hydraquents	---	---	---	---	---	---	---
HmE---------- Humatas	40	55	35	15	17	---	20
HmF---------- Humatas	---	---	---	---	14	---	---
HS**---------- Hydraquents	---	---	---	---	---	---	---
InD, InE---------- Ingenio	50	60	40	15	17	---	20
IsC---------- Islote	50	60	40	13	---	---	10
Ja---------- Jareales	55	40	35	---	15	17	---
JoC---------- Jobos	---	---	---	14	20	---	24
JuD2, JuE2---------- Juncal	50	60	40	15	20	---	13
LcE2---------- Lirios	40	55	35	14	17	---	20
LcF2---------- Lirios	---	---	---	---	---	---	---
LgD---------- Los Guineos	40	55	35	15	17	---	20
LgE---------- Los Guineos	35	45	30	14	17	---	20
LgF---------- Los Guineos	---	---	---	---	---	---	---
LME**:							
Los Guineos----------	---	---	---	---	---	---	---
Maricao----------	---	---	---	---	17	---	20
Rock outcrop----------	---	---	---	---	---	---	---
MaF2---------- Maraguez	---	---	---	---	---	---	---
McF---------- Maricao	---	---	---	---	---	---	---
MmF---------- Matanzas-Rock outcrop	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Spring sugarcane	18-month sugarcane	Ratoon sugarcane	Merkergrass	Pangola-grass	Paragrass	Guinea-grass
	Ton	Ton	Ton	Ton	AUM*	AUM*	AUM*
MnB---------- Matanzas	55	70	45	19	20	17	24
MoC2---------- Moca	50	60	40	15	13	---	15
MoD2---------- Moca	40	55	35	14	13	---	15
MoE2---------- Moca	35	45	30	13	13	---	15
MpF2---------- Morado	---	---	---	---	---	---	---
MuE---------- Mucara	35	45	30	13	17	---	20
MuF---------- Mucara	---	---	---	---	---	---	---
NaD, NaE, NaF---------- Naranjo	40	55	35	13	20	---	13
Pa---------- Palmar	---	---	---	---	20	17	---
PeF---------- Pellejas	---	---	---	---	---	---	---
PhC2, PhD2---------- Perchas	40	55	35	13	15	17	---
Ps**, Pt**---------- Pits	---	---	---	---	---	---	---
Re---------- Reilly	40	55	35	15	15	---	18
RlC---------- Rio Lajas	40	55	35	14	10	---	12
Rm**---------- Riverwash	---	---	---	---	---	---	---
Ro**, Rr**---------- Rock outcrop	---	---	---	---	---	---	---
RsF---------- Rock outcrop-San German	---	---	---	---	---	---	---
RtF---------- Rock outcrop-Tanama	---	---	---	---	---	---	---
SaB---------- Sabana Seca	50	60	40	14	15	17	---
SgD---------- San German	---	---	---	---	---	---	---
SgF---------- San German	---	---	---	---	---	---	---
SmF---------- San Sebastian	---	---	---	---	12	---	---
SnC---------- Santa Clara	50	60	40	15	20	---	13

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Spring sugarcane	18-month sugarcane	Ratoon sugarcane	Merkergrass	Pangola-grass	Paragrass	Guinea-grass
	Ton	Ton	Ton	Ton	AUM*	AUM*	AUM*
SoC---------- Soller	40	55	35	15	17	---	12
SoD---------- Soller	35	45	30	13	17	---	12
SoF---------- Soller	---	---	---	---	---	---	---
SpD---------- Soller	---	---	---	---	15	---	10
SpF, SrF---------- Soller	---	---	---	---	---	---	---
TaB---------- Tanama	40	55	35	---	15	---	10
TaC2---------- Tanama	35	45	30	---	15	---	10
TaD2---------- Tanama	---	---	---	---	15	---	10
Tb---------- Tiburones	---	---	---	---	20	17	---
To---------- Toa	60	80	50	20	20	17	24
TP**---------- Tropopsamments	---	---	---	---	---	---	---
Ur**---------- Urban land	---	---	---	---	---	---	---
VaB---------- Vega Alta	55	70	45	19	20	17	24
VaC2---------- Vega Alta	50	60	40	17	20	17	24
VcB---------- Vega Alta	55	70	45	19	20	17	24
VcC2---------- Vega Alta	50	60	40	17	20	17	24
VeB---------- Vega Baja	55	70	45	16	15	17	---
Vg---------- Vigia	---	---	---	---	20	17	---
Vm---------- Vivi	55	70	45	16	20	---	24
VoC2---------- Voladora	50	60	40	16	17	---	20
VoD2---------- Voladora	40	55	35	15	17	---	20
VoE2---------- Voladora	35	45	30	13	17	---	20

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	6,180	---	---	---
II	35,805	26,733	5,911	3,161
III	41,185	36,121	4,788	276
IV	21,701	14,654	3,150	3,897
V	---	---	---	---
VI	54,805	38,943	1,551	14,311
VII	165,041	130,537	4,712	29,792
VIII	1,691	---	1,272	419

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Average yearly growth per acre	
						Bd ft	
AdF2---------- Adjuntas	3c	Severe	Severe	Slight	Honduras pine---------	900	Honduras pine, robusta eucalyptus.
AoE2---------- Alonso	2c	Moderate	Moderate	Slight	Honduras pine---------	1,300	Honduras pine, robusta eucalyptus.
AoF2---------- Alonso	3c	Severe	Severe	Slight	Honduras pine---------	1,000	Honduras pine, robusta eucalyptus.
CaF---------- Caguabo	4d	Severe	Severe	Severe	Honduras pine---------	700	Honduras pine.
CbF*: Caguabo----------	4d	Severe	Severe	Severe	Honduras pine---------	700	Honduras pine.
Rock outcrop.							
ClD2---------- Colinas	2d	Slight	Slight	Slight	Honduras mahogany-----	450	Honduras pine, Honduras mahogany, mahoe, teak.
ClE2---------- Colinas	3d	Moderate	Moderate	Slight	Honduras mahogany-----	350	Honduras mahogany.
CoE, CoF---------- Consejo	2c	Moderate	Moderate	Slight	Honduras pine---------	1,300	Honduras pine, robusta eucalyptus.
CpE---------- Consumo	2c	Moderate	Moderate	Slight	Honduras pine---------	1,100	Honduras pine, robusta eucalyptus.
CpF---------- Consumo	3c	Severe	Severe	Slight	Honduras pine---------	1,000	Honduras pine, robusta eucalyptus.
CuF---------- Cuchillas	3d	Moderate	Moderate	Slight	Honduras pine---------	900	Honduras pine.
CvF*: Cuchillas---------	3d	Moderate	Moderate	Slight	Honduras pine---------	900	Honduras pine.
Rock outcrop.							
DaD2---------- Daguey	2c	Slight	Moderate	Slight	Honduras pine---------	1,300	Honduras pine, Honduras mahogany, kadam, mahoe, robusta eucalyptus.
HmE---------- Humatas	2c	Moderate	Moderate	Slight	Honduras pine---------	1,100	Honduras pine, robusta eucalyptus.
HmF---------- Humatas	3c	Severe	Severe	Slight	Honduras pine---------	1,000	Honduras pine, robusta eucalyptus.
InD, InE---------- Ingenio	2c	Moderate	Moderate	Slight	Honduras pine---------	1,300	Honduras pine.
JuD2, JuE2--------- Juncal	2c	Slight	Slight	Slight	Honduras pine--------- Honduras mahogany-----	1,200 450	Honduras pine, Honduras mahogany.
LcE2---------- Lirios	2c	Moderate	Moderate	Slight	Honduras pine---------	1,200	Honduras pine, robusta eucalyptus.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Average yearly growth per acre	
						Bd ft	
LcF2---------- Lirios	2c	Moderate	Moderate	Slight	Honduras pine---------	1,100	Honduras pine, robusta eucalyptus.
LgD---------- Los Guineos	2c	Slight	Moderate	Slight	Honduras pine---------	1,400	Honduras pine, Honduras mahogany, kadam, mahoe, robusta eucalyptus.
LgE, LgF---------- Los Guineos	2c	Moderate	Moderate	Slight	Honduras pine---------	1,400	Honduras pine, robusta eucalyptus.
LME*:							
Los Guineos-------	2c	Moderate	Moderate	Slight	Honduras pine---------	1,400	Honduras pine, robusta eucalyptus.
Maricao----------	2c	Moderate	Moderate	Slight	Honduras pine---------	1,300	Honduras pine, robusta eucalyptus.
Rock outcrop.							
MaF2---------- Maraguez	3d	Moderate	Severe	Slight	Honduras pine---------	900	Honduras pine.
McF---------- Maricao	2c	Moderate	Moderate	Slight	Honduras pine---------	1,300	Honduras pine, robusta eucalyptus.
MoC2---------- Moca	2c	Slight	Moderate	Slight	Honduras pine---------	1,200	Honduras pine, Honduras mahogany, kadam, mahoe.
MoE2---------- Moca	2c	Moderate	Moderate	Slight	Honduras pine---------	1,200	Honduras pine.
MpF2---------- Morado	3d	Severe	Severe	Slight	Honduras pine---------	900	Honduras pine, robusta eucalyptus.
MuE---------- Mucara	3d	Moderate	Moderate	Slight	Honduras pine---------	900	Honduras pine, robusta eucalyptus.
MuF---------- Mucara	3d	Severe	Severe	Slight	Honduras pine---------	900	Honduras pine, robusta eucalyptus.
NaD, NaE, NaF------ Naranjo	2c	Slight	Moderate	Slight	Honduras pine---------	1,200	Honduras pine, Honduras mahogany, teak, mahoe, kadam.
PeF---------- Pellejas	3n	Severe	Severe	Slight	Honduras pine---------	900	Honduras pine, robusta eucalyptus.
RtF*: Rock outcrop.							
Tanama----------	3d	Moderate	Moderate	Moderate	Honduras mahogany-----	350	Honduras mahogany.
SmF---------- San Sebastian	3d	Moderate	Moderate	Moderate	Honduras mahogany-----	350	Honduras mahogany.
SnC---------- Santa Clara	2d	Slight	Slight	Slight	Honduras mahogany-----	450	Honduras pine.
SoC, SoD, SpD------ Soller	3d	Slight	Moderate	Slight	Honduras pine---------	850	Honduras pine, Honduras mahogany, teak, mahoe.
SrF*: Soller----------	4d	Moderate	Moderate	Slight	Honduras mahogany-----	350	Honduras mahogany.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns			Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Common trees	Average yearly growth per acre	
						Bd ft	
SrF*: Rock outcrop.							
TaB---------- Tanama	3d	Slight	Moderate	Slight	Honduras pine--------- Honduras pine--------- Honduras pine---------	850 850 850	Honduras pine, Honduras mahogany, teak, mahoe.
TaC2---------- Tanama	3d	Slight	Moderate	Slight	Honduras pine--------- Honduras pine--------- Honduras pine---------	850 850 850	Honduras pine, Honduras mahogany, teak, mahoe.
TaD2---------- Tanama	3d	Slight	Moderate	Slight	Honduras pine--------- Honduras pine--------- Honduras pine---------	850 850 850	Honduras pine, Honduras mahogany, teak, mahoe.
VoC2---------- Voladora	2c	Slight	Moderate	Slight	Honduras pine---------	1,200	Honduras pine, Honduras mahogany, kadam, mahoe.
VoD2---------- Voladora	2c	Slight	Moderate	Slight	Honduras pine---------	1,200	Honduras pine, Honduras mahogany, kadam, mahoe.
VoE2---------- Voladora	2c	Moderate	Moderate	Slight	Honduras pine---------	1,200	Honduras pine.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
AaC Aceitunas	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
AcC Aceitunas	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
AdF2 Adjuntas	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
AgC Algarrobo	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
AlB Almirante	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
AlC Almirante	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
AmB Almirante	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
AmC Almirante	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
AnB Almirante	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
AnC Almirante	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
AoD2 Alonso	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too clayey.
AoE2, AoF2 Alonso	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ArC Arecibo	Moderate: too sandy.	Moderate: too sandy.	Severe: slope, too sandy, soil blowing.	Moderate: too sandy.
Ba Bajura	Severe: floods, wetness, too clayey.	Severe: floods, too clayey, wetness.	Severe: floods, wetness, too clayey.	Severe: too clayey, wetness.
BcB Bayamon	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
BcC Bayamon	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
BsB Bayamon	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
BsC Bayamon	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
ByB Bayamon	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
ByC Bayamon	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
CaF Caguabo	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, too clayey.	Severe: slope.
CbF*: Caguabo	Severe: slope.	Severe: slope.	Severe: slope, depth to rock, too clayey.	Severe: slope.
Rock outcrop.				
CcD Caracoles	Moderate: slope.	Moderate: slope.	Severe: depth to rock, slope.	Slight.
CcE Caracoles	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
CeC Carrizales	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
Cf Catano	Moderate: too sandy.	Moderate: too sandy.	Severe: too sandy.	Moderate: too sandy.
Cg*. Coastal beaches				
ClD2 Colinas	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.
ClE2, ClF2, CmF2 Colinas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Cn Coloso	Severe: floods, wetness, too clayey.	Severe: too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey.
CoE, CoF Consejo	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
CpE, CpF Consumo	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
CrC Corozal	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: slope, too clayey, wetness.	Severe: too clayey.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
CsC--Corozo	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.
CtB--Coto	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
CtC--Coto	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
CuF--Cuchillas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
CvF*: Cuchillas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.				
DaD2--Daguey	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: too clayey.
EaB--Espinosa	Slight	Slight	Moderate: slope.	Slight.
EaC--Espinosa	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
EbB, EbC--Espinosa	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
EcB--Espinosa	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
EcC--Espinosa	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
Ga--Garrochales	Severe: excess humus, floods, percs slowly.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.
GeC--Guerrero	Moderate: too sandy.	Moderate: too sandy.	Severe: too sandy.	Severe: too sandy.
HD*. Hydraquents				
HmE, HmF--Humatas	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
HS*. Hydraquents				
InD--Ingenio	Severe: slope.	Severe: slope.	Severe: slope.	Slight.
InE--Ingenio	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
IsC--Islote	Moderate: too clayey.	Moderate: too clayey.	Severe: slope.	Moderate: too clayey.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Ja Jareales	Severe: floods, percs slowly, too clayey.	Severe: too clayey, wetness.	Severe: floods, percs slowly, too clayey.	Severe: floods, too clayey, wetness.
JoC Jobos	Moderate: percs slowly.	Slight	Moderate: percs slowly, slope.	Slight.
JuD2, JuE2 Juncal	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
LcE2, LcF2 Lirios	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LgD Los Guineos	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: too clayey.
LgE, LgF Los Guineos	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
LME*: Los Guineos	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
Maricao	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
Rock outcrop.				
MaF2 Maraguez	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
McF Maricao	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
MmF*: Matanzas	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
Rock outcrop.				
MnB Matanzas	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
MoC2 Moca	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
MoD2 Moca	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: too clayey.
MoE2 Moca	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
MpF2 Morado	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
MuE, MuF Mucara	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.
NaD Naranjo	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey.	Severe: too clayey.
NaE, NaF Naranjo	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: too clayey.
Pa Palmar	Severe: excess humus, floods, percs slowly.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.
PeF Pellejas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PhC2 Perchas	Severe: percs slowly, too clayey.	Severe: percs slowly, too clayey.	Severe: slope, percs slowly, too clayey.	Severe: too clayey, wetness.
PhD2 Perchas	Severe: slope, percs slowly, too clayey.	Severe: slope, too clayey, wetness.	Severe: slope, percs slowly, too clayey.	Severe: too clayey, wetness.
Ps*, Pt*. Pits				
Re Reilly	Moderate: floods, small stones.	Moderate: floods, small stones.	Severe: floods, small stones.	Moderate: small stones.
RlC Rio Lajas	Slight	Slight	Moderate: slope.	Slight.
Rm*. Riverwash				
Ro*, Rr*. Rock outcrop				
RsF*: Rock outcrop.				
San German	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, depth to rock, small stones.	Severe: slope, small stones.
RtF*: Rock outcrop.				
Tanama	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, depth to rock, too clayey.	Severe: slope, too clayey.
SaB Sabana Seca	Severe: percs slowly, too clayey, wetness.	Severe: too clayey, wetness.	Severe: percs slowly, too clayey, wetness.	Severe: too clayey, wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
SgD---------- San German	Severe: small stones.	Severe: small stones.	Severe: slope, depth to rock, small stones.	Severe: small stones.
SgF---------- San German	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, depth to rock, small stones.	Severe: slope, small stones.
SmF---------- San Sebastian	Severe: slope, small stones, too clayey.	Severe: slope, small stones, too clayey.	Severe: slope, small stones, too clayey.	Severe: slope, small stones, too clayey.
SnC---------- Santa Clara	Moderate: too clayey.	Moderate: too clayey.	Moderate: depth to rock, slope, too clayey.	Moderate: too clayey.
SoC---------- Soller	Severe: too clayey.	Severe: too clayey.	Severe: slope, too clayey, depth to rock.	Severe: too clayey.
SoD---------- Soller	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey, depth to rock.	Severe: too clayey.
SoF---------- Soller	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey, depth to rock.	Severe: slope, too clayey.
SpD---------- Soller	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, depth to rock, small stones.	Severe: too clayey.
SpF---------- Soller	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, depth to rock, small stones.	Severe: slope, too clayey.
SrF*: Soller----------	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, too clayey, depth to rock.	Severe: slope, too clayey.
Rock outcrop.				
TaB---------- Tanama	Severe: too clayey.	Severe: too clayey.	Severe: depth to rock, too clayey.	Severe: too clayey.
TaC2---------- Tanama	Severe: too clayey.	Severe: too clayey.	Severe: slope, depth to rock, too clayey.	Severe: too clayey.
TaD2---------- Tanama	Severe: slope, too clayey.	Severe: slope, too clayey.	Severe: slope, depth to rock, too clayey.	Severe: too clayey.
Tb---------- Tiburones	Severe: excess humus, floods, percs slowly.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.

See footnote at end of table.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
To Toa	Severe: floods.	Slight	Moderate: floods.	Moderate: too clayey.
TP*. Tropopsamments				
Ur*. Urban land				
VaB Vega Alta	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
VaC2 Vega Alta	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
VcB Vega Alta	Moderate: too clayey.	Moderate: too clayey.	Moderate: slope, too clayey.	Moderate: too clayey.
VcC2 Vega Alta	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
VeB Vega Baja	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
Vg Vigia	Severe: floods, percs slowly, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.
Vm Vivi	Severe: floods.	Slight	Moderate: floods.	Slight.
VoC2 Voladora	Moderate: slope, too clayey.	Moderate: slope, too clayey.	Severe: slope.	Moderate: too clayey.
VoD2 Voladora	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.
VoE2 Voladora	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
AaC, AcC---------- Aceitunas	Moderate: slope, too clayey.	Moderate: slope, low strength.	Severe: slope.	Moderate: slope, low strength.
AdF2---------- Adjuntas	Severe: slope, too clayey.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope, low strength.
AgC---------- Algarrobo	Severe: too sandy, too clayey.	Slight----------	Moderate: slope.	Slight.
AlB---------- Almirante	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.
AlC---------- Almirante	Moderate: slope, too clayey.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.
AmB---------- Almirante	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.
AmC---------- Almirante	Moderate: slope, too clayey.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.
AnB---------- Almirante	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.
AnC---------- Almirante	Moderate: slope, too clayey.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.
AoD2, AoE2, AoF2-- Alonso	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
ArC---------- Arecibo	Severe: cutbanks cave.	Slight----------	Moderate: slope.	Slight.
Ba---------- Bajura	Severe: floods, too clayey, wetness.	Severe: floods, shrink-swell, wetness.	Severe: floods, shrink-swell, wetness.	Severe: floods, shrink-swell, wetness.
BcB---------- Bayamon	Moderate: too clayey.	Slight----------	Slight----------	Moderate: low strength.
BcC---------- Bayamon	Moderate: slope, too clayey.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.
BsB---------- Bayamon	Moderate: too clayey.	Slight----------	Slight----------	Moderate: low strength.
BsC---------- Bayamon	Moderate: slope, too clayey.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
ByB---------- Bayamon	Moderate: too clayey.	Slight----------	Slight----------	Moderate: low strength.
ByC---------- Bayamon	Moderate: slope, too clayey.	Moderate: slope.	Severe: slope.	Moderate: slope, low strength.
CaF---------- Caguabo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
CbF*: Caguabo----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
Rock outcrop.				
CcD---------- Caracoles	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
CcE---------- Caracoles	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
CeC---------- Carrizales	Severe: cutbanks cave.	Slight----------	Moderate: slope.	Slight.
Cf---------- Catano	Severe: cutbanks cave.	Slight----------	Slight----------	Slight.
Cg*. Coastal beaches				
ClD2, ClE2, ClF2, CmF2---------- Colinas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.
Cn---------- Coloso	Severe: floods, too clayey, wetness.	Severe: floods, shrink-swell.	Severe: floods, shrink-swell, corrosive.	Severe: floods, shrink-swell, low strength.
CoE, CoF---------- Consejo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, low strength.
CpE, CpF---------- Consumo	Severe: slope, too clayey.	Severe: slope, low strength.	Severe: slope, low strength, corrosive.	Severe: slope, low strength.
CrC---------- Corozal	Severe: too clayey, wetness.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, shrink-swell, wetness.
CsC---------- Corozo	Slight----------	Slight----------	Moderate: slope.	Slight.
CtB---------- Coto	Moderate: too clayey.	Moderate: low strength.	Moderate: low strength.	Moderate: low strength.
CtC---------- Coto	Moderate: slope, too clayey.	Moderate: slope, low strength.	Severe----------	Moderate: slope, low strength.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
CuF---------- Cuchillas	Severe: depth to rock.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
CvF*: Cuchillas--------	Severe: depth to rock.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.
Rock outcrop.				
DaD2---------- Daguey	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
EaB---------- Espinosa	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.
EaC---------- Espinosa	Severe: too clayey.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.
EbB---------- Espinosa	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.
EbC---------- Espinosa	Severe: too clayey.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.
EcB---------- Espinosa	Severe: too clayey.	Severe: low strength.	Severe: low strength.	Severe: low strength.
EcC---------- Espinosa	Severe: too clayey.	Severe: low strength.	Severe: slope, low strength.	Severe: low strength.
Ga---------- Garrochales	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.
GeC---------- Guerrero	Moderate: too clayey.	Slight----------	Slight----------	Slight.
HD*. Hydraquents				
HmE, HmF---------- Humatas	Severe: slope.	Severe: slope.	Severe: slope, corrosive.	Severe: slope.
HS*. Hydraquents				
InD, InE---------- Ingenio	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
IsC---------- Islote	Moderate: depth to rock.	Severe: low strength.	Severe: low strength.	Severe: low strength.
Ja---------- Jareales	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: floods, shrink-swell, wetness.	Severe: excess humus, floods, wetness.
JoC---------- Jobos	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
JuD2, JuE2-------- Juncal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LcE2, LcF2-------- Lirios	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
LgD, LgE, LgF----- Los Guineos	Severe: slope, too clayey.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope, low strength.
LME*: Los Guineos------	Severe: slope, too clayey.	Severe: slope, low strength.	Severe: slope, low strength.	Severe: slope, low strength.
Maricao---------- Rock outcrop.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MaF2-------------- Maraguez	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
McF--------------- Maricao	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MmF*: Matanzas--------- Rock outcrop.	Moderate: depth to rock, too clayey.	Slight----------	Slight----------	Moderate: low strength.
MnB--------------- Matanzas	Moderate: depth to rock, too clayey.	Slight----------	Slight----------	Moderate: low strength.
MoC2-------------- Moca	Moderate: too clayey.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.	Severe: low strength, shrink-swell.
MoD2, MoE2-------- Moca	Severe: slope.	Severe: slope, low strength, shrink-swell.	Severe: slope, low strength, shrink-swell.	Severe: slope, low strength, shrink-swell.
MpF2-------------- Morado	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
MuE, MuF---------- Mucara	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.	Severe: slope.
NaD--------------- Naranjo	Moderate: slope, too clayey.	Moderate: slope, shrink-swell, too clayey.	Severe: slope.	Moderate: slope, shrink-swell.
NaE, NaF---------- Naranjo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pa---------------- Palmar	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
PeF---------- Pellejas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
PhC2---------- Perchas	Severe: too clayey, wetness.	Severe: shrink-swell, wetness.	Severe: slope, shrink-swell, wetness.	Severe: shrink-swell, wetness.
PhD2---------- Perchas	Severe: slope, too clayey, wetness.	Severe: slope, shrink-swell, wetness.	Severe: slope, shrink-swell, wetness.	Severe: slope, shrink-swell, wetness.
Ps*, Pt*. Pits				
Re---------- Reilly	Severe: cutbanks cave, floods, small stones.	Severe: floods.	Severe: floods.	Severe: floods.
RlC---------- Rio Lajas	Slight----------	Slight----------	Slight----------	Slight.
Rm*. Riverwash				
Ro*, Rr*. Rock outcrop				
RsF*: Rock outcrop.				
San German-------	Severe: slope, depth to rock, small stones.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
RtF*: Rock outcrop.				
Tanama----------	Severe: slope, depth to rock, too clayey.	Severe: slope, depth to rock, low strength.	Severe: slope, depth to rock.	Severe: slope, depth to rock, low strength.
SaB---------- Sabana Seca	Severe: too clayey, wetness.	Severe: low strength, wetness.	Severe: low strength, wetness.	Severe: low strength, wetness.
SgD---------- San German	Severe: depth to rock, small stones.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.
SgF---------- San German	Severe: slope, depth to rock, small stones.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.
SmF---------- San Sebastian	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Severe: slope.
SnC---------- Santa Clara	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: depth to rock, shrink-swell.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
SoC---------- Soller	Severe: depth to rock, too clayey.	Moderate: slope, depth to rock.	Severe: slope.	Severe: low strength, depth to rock.
SoD, SoF, SpD, SpF---------- Soller	Severe: slope, depth to rock, too clayey.	Severe: slope.	Severe: slope.	Severe: slope, low strength, depth to rock.
SrF*: Soller----------	Severe: slope, depth to rock, too clayey.	Severe: slope.	Severe: slope.	Severe: slope, low strength, depth to rock.
Rock outcrop.				
TaB---------- Tanama	Severe: depth to rock, too clayey.	Severe: depth to rock, low strength.	Severe: depth to rock, low strength.	Severe: depth to rock, low strength.
TaC2---------- Tanama	Severe: depth to rock, too clayey.	Severe: depth to rock, low strength.	Severe: slope, depth to rock, corrosive.	Severe: depth to rock, low strength.
TaD2---------- Tanama	Severe: slope, depth to rock, too clayey.	Severe: slope, depth to rock, low strength.	Severe: slope, depth to rock, corrosive.	Severe: slope, depth to rock, low strength.
Tb---------- Tiburones	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.
To. Toa				
TP*. Tropopsamments				
Ur*. Urban land				
VaB---------- Vega Alta	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.
VaC2---------- Vega Alta	Moderate: slope, too clayey.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.
VcB---------- Vega Alta	Moderate: too clayey.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.	Moderate: low strength, shrink-swell.
VcC2---------- Vega Alta	Moderate: slope, too clayey.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.
VeB. Vega Baja				

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets
Vg Vigia	Severe: floods, too clayey, wetness.	Severe: floods, shrink-swell, wetness.	Severe: floods, shrink-swell.	Severe: floods, shrink-swell, wetness.
Vm. Vivi				
VoC2 Voladora	Moderate: slope, too clayey.	Moderate: slope, low strength, shrink-swell.	Severe: slope.	Moderate: slope, low strength, shrink-swell.
VoD2, VoE2 Voladora	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AaC, AcC Aceitunas	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, too clayey.
AdF2 Adjuntas	Severe: slope.	Severe: slope.	Severe: slope, too clayey, depth to rock.	Severe: slope.	Poor: slope, too clayey.
AgC Algarrobo	Severe: percs slowly.	Severe: slope, seepage.	Moderate: too clayey.	Severe: seepage.	Poor: too sandy, seepage.
AlB Almirante	Slight	Moderate: slope.	Moderate: too clayey.	Slight	Fair: hard to pack, too clayey.
AlC Almirante	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Poor: slope, hard to pack, too clayey.
AmB Almirante	Slight	Moderate: slope.	Moderate: too clayey.	Slight	Fair: hard to pack, too clayey.
AmC Almirante	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Poor: slope, hard to pack, too clayey.
AnB Almirante	Slight	Moderate: slope.	Moderate: too clayey.	Slight	Fair: hard to pack, too clayey.
AnC Almirante	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Poor: slope, hard to pack, too clayey.
AoD2 Alonso	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.	Poor: slope, too clayey.
AoE2, AoF2 Alonso	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope, too clayey.
ArC Arecibo	Slight	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Ba Bajura	Severe: floods, percs slowly, wetness.	Severe: floods, wetness.	Severe: floods, too clayey, wetness.	Severe: floods, wetness.	Poor: hard to pack, too clayey, wetness.
BcB Bayamon	Slight	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: hard to pack, too clayey.
BcC Bayamon	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, hard to pack, too clayey.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
BsB---------- Bayamon	Slight----------	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Fair: hard to pack, too clayey.
BsC---------- Bayamon	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, hard to pack, too clayey.
ByB---------- Bayamon	Slight----------	Moderate: slope, seepage.	Moderate: too clayey.	Slight----------	Fair: hard to pack, too clayey.
ByC---------- Bayamon	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, hard to pack, too clayey.
CaF---------- Caguabo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, small stones.
CbF*: Caguabo----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, small stones.
Rock outcrop.					
CcD---------- Caracoles	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: thin layer.
CcE---------- Caracoles	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Poor: slope, thin layer.
CeC---------- Carrizales	Slight----------	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
Cf---------- Catano	Slight----------	Severe: seepage.	Severe: too sandy, seepage.	Severe: seepage.	Poor: seepage, too sandy.
Cg*. Coastal beaches					
ClD2---------- Colinas	Severe: slope.	Severe: slope, seepage.	Severe: seepage.	Severe: slope, seepage.	Poor: slope.
ClE2, ClF2, CmF2---- Colinas	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope.
Cn---------- Coloso	Severe: floods, percs slowly, wetness.	Severe: floods, wetness.	Severe: floods, too clayey.	Severe: floods.	Poor: too clayey, hard to pack.
CoE, CoF---------- Consejo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
CpE, CpF Consumo	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
CrC Corozal	Severe: percs slowly, wetness.	Severe: slope.	Severe: too clayey, wetness.	Moderate: wetness.	Poor: hard to pack, too clayey.
CsC Corozo	Slight	Severe: slope, seepage.	Severe: seepage, too sandy.	Severe: seepage.	Fair: too sandy.
CtB Coto	Moderate: percs slowly.	Moderate: slope, seepage.	Moderate: too clayey.	Slight	Fair: too clayey.
CtC Coto	Moderate: slope, percs slowly.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, too clayey.
CuF Cuchillas	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope.	Poor: area reclaim, slope, thin layer.
CvF*: Cuchillas	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: slope.	Poor: area reclaim, slope, thin layer.
Rock outcrop.					
DaD2 Daguey	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.	Poor: slope.
EaB Espinosa	Slight	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey.
EaC Espinosa	Moderate: slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
EbB Espinosa	Slight	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey.
EbC Espinosa	Moderate: slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
EcB Espinosa	Slight	Moderate: slope, seepage.	Severe: too clayey.	Slight	Poor: too clayey.
EcC Espinosa	Moderate: slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
Ga Garrochales	Severe: floods, percs slowly, wetness.	Severe: excess humus, floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: excess humus, wetness.
GeC Guerrero	Severe: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Good.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HD*. Hydraquents					
HmE, HmF---------- Humatas	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
HS*. Hydraquents					
InD---------- Ingenio	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
InE---------- Ingenio	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
IsC---------- Islote	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Slight----------	Poor: too clayey.
Ja---------- Jareales	Severe: floods, percs slowly, wetness.	Severe: excess humus, floods, wetness.	Severe: excess humus, floods, wetness.	Severe: floods, wetness.	Poor: excess humus, wetness.
JoC---------- Jobos	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Poor: area reclaim, thin layer, too sandy.
JuD2---------- Juncal	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.	Poor: slope.
JuE2---------- Juncal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
LcE2, LcF2---------- Lirios	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
LgD---------- Los Guineos	Severe: slope.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
LgE, LgF---------- Los Guineos	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
LME*: Los Guineos--------	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, too clayey, hard to pack.
Maricao----------	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, hard to pack, too clayey.
Rock outcrop.					
MaF2---------- Maraguez	Severe: slope.	Severe: slope, seepage.	Severe: slope, seepage.	Severe: slope, seepage.	Poor: slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
McF---------- Maricao	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, hard to pack, too clayey.
MmF*: Matanzas----------	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Slight----------	Fair: hard to pack, too clayey.
Rock outcrop.					
MnB---------- Matanzas	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Slight----------	Fair: hard to pack, too clayey.
MoC2---------- Moca	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Slight----------	Poor: hard to pack, too clayey.
MoD2---------- Moca	Severe: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: slope, hard to pack, too clayey.
MoE2---------- Moca	Severe: slope, percs slowly.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope, hard to pack, too clayey.
MpF2---------- Morado	Severe: slope, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage, depth to rock.	Severe: slope, seepage.	Poor: slope.
MuE, MuF---------- Mucara	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Poor: slope, thin layer, too clayey.
NaD---------- Naranjo	Moderate: slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.
NaE, NaF---------- Naranjo	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: slope.
Pa---------- Palmar	Severe: floods, percs slowly, wetness.	Severe: excess humus, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: excess humus, wetness.
PeF---------- Pellejas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
PhC2---------- Perchas	Severe: percs slowly.	Severe: slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: hard to pack, too clayey.
PhD2---------- Perchas	Severe: slope, percs slowly.	Severe: slope.	Severe: too clayey, wetness.	Severe: slope, wetness.	Poor: slope, hard to pack, too clayey.
Ps*, Pt*. Pits					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Re---------- Reilly	Severe: floods.	Severe: floods, seepage, small stones.	Severe: floods, seepage, small stones.	Severe: floods, seepage.	Poor: seepage, small stones, thin layer.
RlC---------- Rio Lajas	Slight----------	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Good.
Rm*. Riverwash					
Ro*, Rr*. Rock outcrop					
RsF*: Rock outcrop.					
San German----------	Severe: slope, depth to rock.	Severe: slope, depth to rock, small stones.	Severe: slope, depth to rock, small stones.	Severe: slope.	Poor: slope, area reclaim, small stones.
RtF*: Rock outcrop.					
Tanama----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope.	Poor: slope, thin layer, area reclaim.
SaB---------- Sabana Seca	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey, wetness.
SgD---------- San German	Severe: depth to rock.	Severe: slope, depth to rock, small stones.	Severe: depth to rock, small stones.	Moderate: slope.	Poor: area reclaim, small stones, thin layer.
SgF---------- San German	Severe: slope, depth to rock.	Severe: slope, depth to rock, small stones.	Severe: slope, depth to rock, small stones.	Severe: slope.	Poor: slope, area reclaim, small stones.
SmF---------- San Sebastian	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.	Poor: slope, small stones.
SnC---------- Santa Clara	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight----------	Poor: area reclaim, thin layer.
SoC---------- Soller	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: thin layer, area reclaim.
SoD---------- Soller	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: slope.	Poor: slope, thin layer, area reclaim.
SoF---------- Soller	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope.	Poor: slope, thin layer, area reclaim.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
SpD---------- Soller	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: slope.	Poor: slope, thin layer, area reclaim.
SpF---------- Soller	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope.	Poor: slope, thin layer, area reclaim.
SrF*: Soller----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock, too clayey.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Rock outcrop.					
TaB---------- Tanama	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Slight----------	Poor: thin layer, area reclaim.
TaC2---------- Tanama	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: thin layer, area reclaim.
TaD2---------- Tanama	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, too clayey.	Severe: slope.	Poor: slope, thin layer, area reclaim.
Tb---------- Tiburones	Severe: floods, percs slowly, wetness.	Severe: excess humus, floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Poor: excess humus, wetness.
To---------- Toa	Severe: floods.	Severe: floods.	Severe: floods, too clayey.	Severe: floods.	Fair: too clayey.
TP*. Tropopsamments					
Ur*. Urban land					
VaB---------- Vega Alta	Moderate: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Fair: hard to pack, too clayey.
VaC2---------- Vega Alta	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, hard to pack, too clayey.
VcB---------- Vega Alta	Moderate: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight----------	Fair: hard to pack, too clayey.
VcC2---------- Vega Alta	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, hard to pack, too clayey.
VeB---------- Vega Baja	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, wetness, too clayey.	Severe: floods, wetness.	Poor: area reclaim, hard to pack, too clayey.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Vg Vigia	Severe: floods, percs slowly, wetness.	Severe: floods, wetness.	Severe: floods, too clayey, wetness.	Severe: floods, wetness.	Poor: hard to pack, too clayey, wetness.
Vm Vivi	Severe: floods, poor filter.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods, seepage.	Good.
VoC2 Voladora	Moderate: slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: slope, too clayey.
VoD2 Voladora	Severe: slope.	Severe: slope.	Moderate: slope, too clayey.	Severe: slope.	Poor: slope.
VoE2 Voladora	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AaC, AcC---------- Aceitunas	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
AdF2---------- Adjuntas	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
AgC---------- Algarrobo	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, area reclaim.
AlB---------- Almirante	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: low strength, shrink-swell.
AlC---------- Almirante	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, low strength, shrink-swell.
AmB---------- Almirante	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: low strength, shrink-swell.
AmC---------- Almirante	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, low strength, shrink-swell.
AnB---------- Almirante	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: low strength, shrink-swell.
AnC---------- Almirante	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, low strength, shrink-swell.
AoD2, AoE2, AoF2------ Alonso	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ArC---------- Arecibo	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Ba---------- Bajura	Poor: shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
BcB---------- Bayamon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: low strength.
BcC---------- Bayamon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, low strength.
BsB---------- Bayamon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: low strength.
BsC---------- Bayamon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, low strength.
ByB---------- Bayamon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: low strength.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
ByC---------- Bayamon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, low strength.
CaF---------- Caguabo	Poor: slope, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
CbF*: Caguabo----------	Poor: slope, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, thin layer.
Rock outcrop.				
CcD---------- Caracoles	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, thin layer.
CcE---------- Caracoles	Poor: slope, area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim, thin layer.
CeC---------- Carrizales	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Cf---------- Catano	Good----------	Probable----------	Improbable: too sandy.	Poor: too sandy.
Cg*. Coastal beaches				
ClD2---------- Colinas	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
ClE2, ClF2---------- Colinas	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CmF2---------- Colinas	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
Cn---------- Coloso	Poor: area reclaim, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
CoE, CoF---------- Consejo	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
CpE, CpF---------- Consumo	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
CrC---------- Corozal	Fair: low strength, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey, wetness.
CsC---------- Corozo	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
CtB---------- Coto	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
CtC---------- Coto	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
CuF---------- Cuchillas	Poor: slope, area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope, thin layer.
CvF*: Cuchillas----------	Poor: slope, area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope, thin layer.
Rock outcrop.				
DaD2---------- Daguey	Fair: slope, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
EaB---------- Espinosa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
EaC---------- Espinosa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, thin layer.
EbB---------- Espinosa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
EbC---------- Espinosa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
EcB, EcC---------- Espinosa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Ga---------- Garrochales	Poor: excess humus, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
GeC---------- Guerrero	Fair: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
HD*. Hydraquents				
HmE, HmF---------- Humatas	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
HS*. Hydraquents				
InD---------- Ingenio	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
InE---------- Ingenio	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
IsC---------- Islote	Poor: low strength, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, thin layer.
Ja---------- Jareales	Poor: excess humus, shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
JoC---------- Jobos	Fair: area reclaim, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, thin layer, too sandy.
JuD2, JuE2---------- Juncal	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
LcE2, LcF2---------- Lirios	Poor: slope, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
LgD---------- Los Guineos	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
LgE, LgF---------- Los Guineos	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
LME*: Los Guineos----------	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Maricao----------	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Rock outcrop.				
MaF2---------- Maraguez	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
McF---------- Maricao	Poor: slope, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
MmF*: Matanzas----------	Fair: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Rock outcrop.				
MnB---------- Matanzas	Fair: area reclaim, low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
MoC2---------- Moca	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
MoD2---------- Moca	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
MoE2---------- Moca	Poor: slope, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
MpF2---------- Morado	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
MuE, MuF---------- Mucara	Poor: slope, shrink-swell, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, thin layer.
NaD---------- Naranjo	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
NaE, NaF---------- Naranjo	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey.
Pa---------- Palmar	Poor: excess humus, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
PeF---------- Pellejas	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
PhC2---------- Perchas	Poor: shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
PhD2---------- Perchas	Poor: shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, too clayey, wetness.
Ps*, Pt*. Pits				
Re---------- Reilly	Good----------	Probable----------	Probable----------	Poor: small stones, thin layer.
RlC---------- Rio Lajas	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
Rm*. Riverwash				
Ro*, Rr*. Rock outcrop				
RsF*: Rock outcrop.				
San German----------	Poor: slope, area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, thin layer.
RtF*: Rock outcrop.				
Tanama----------	Poor: slope, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim.
SaB---------- Sabana Seca	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
SgD---------- San German	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, thin layer.
SgF---------- San German	Poor: slope, area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, thin layer.
SmF---------- San Sebastian	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones.
SnC---------- Santa Clara	Poor: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, excess lime, thin layer.
SoC---------- Soller	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
SoD---------- Soller	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim.
SoF---------- Soller	Poor: slope, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim.
SpD---------- Soller	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
SpF---------- Soller	Poor: slope, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, small stones, area reclaim.
SrF*: Soller----------	Poor: slope, thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim.
Rock outcrop.				
TaB, TaC2---------- Tanama	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
TaD2---------- Tanama	Poor: thin layer, area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope, area reclaim.
Tb---------- Tiburones	Poor: excess humus, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
To---------- Toa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
TP*. Tropopsamments				

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ur*. Urban land				
VaB---------- Vega Alta	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
VaC2---------- Vega Alta	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
VcB---------- Vega Alta	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
VcC2---------- Vega Alta	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
VeB---------- Vega Baja	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Vg---------- Vigia	Poor: excess humus, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Vm---------- Vivi	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
VoC2---------- Voladora	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope, too clayey.
VoD2---------- Voladora	Fair: slope, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
VoE2---------- Voladora	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
AaC, AcC---------- Aceitunas	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
AdF2---------- Adjuntas	Severe: slope.	Severe: hard to pack.	Not needed-----	Slow intake, slope.	Slope----------	Slope.
AgC---------- Algarrobo	Severe: seepage.	Severe: hard to pack.	Not needed-----	Droughty, slope, fast intake.	Too sandy, erodes easily.	Erodes easily.
AlB---------- Almirante	Moderate: seepage, slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
AlC---------- Almirante	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
AmB---------- Almirante	Moderate: seepage, slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
AmC---------- Almirante	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
AnB---------- Almirante	Moderate: seepage, slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
AnC---------- Almirante	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
AoD2, AoE2, AoF2-- Alonso	Severe: slope.	Severe: hard to pack.	Not needed-----	Slow intake, slope.	Slope----------	Slope.
ArC---------- Arecibo	Severe: seepage.	Severe: piping.	Not needed-----	Droughty, fast intake, seepage.	Too sandy, slope.	Droughty.
Ba---------- Bajura	Slight---------	Severe: hard to pack, wetness.	Floods, percs slowly, poor outlets.	Slow intake, wetness, floods.	Percs slowly, poor outlets, wetness.	Wetness.
BcB---------- Bayamon	Moderate: seepage, slope.	Severe: hard to pack.	Not needed-----	Complex slope	Slope----------	Favorable.
BcC---------- Bayamon	Severe: slope.	Severe: hard to pack.	Not needed-----	Complex slope	Slope----------	Favorable.
BsB---------- Bayamon	Moderate: seepage, slope.	Severe: hard to pack.	Not needed-----	Complex slope	Slope----------	Favorable.
BsC---------- Bayamon	Severe: slope.	Severe: hard to pack.	Not needed-----	Complex slope	Slope----------	Favorable.
ByB---------- Bayamon	Moderate: seepage, slope.	Severe: hard to pack.	Not needed-----	Complex slope	Slope----------	Favorable.
ByC---------- Bayamon	Severe: slope.	Severe: hard to pack.	Not needed-----	Complex slope	Slope----------	Favorable.
CaF---------- Caguabo	Severe: depth to rock, slope.	Slight---------	Not needed-----	Droughty, depth to rock, slope.	Depth to rock, slope.	Erodes easily, slope.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
CbF*: Caguabo	Severe: depth to rock, slope.	Slight	Not needed	Droughty, depth to rock, slope.	Depth to rock, slope.	Erodes easily, slope.
Rock outcrop.						
CcD, CcE Caracoles	Severe: depth to rock, slope.	Slight	Not needed	Rooting depth, slope, droughty.	Depth to rock, slope.	Droughty, rooting depth, slope.
CeC Carrizales	Severe: seepage.	Severe: piping.	Not needed	Droughty, fast intake, seepage.	Too sandy, erodes easily.	Not needed.
Cf Catano	Severe: seepage.	Severe: seepage, piping.	Not needed	Droughty, fast intake, seepage.	Too sandy, piping.	Not needed.
Cg*. Coastal beaches						
ClD2, ClE2, ClF2, CmF2 Colinas	Severe: seepage, slope.	Severe: piping.	Not needed	Excess lime, seepage, slope.	Piping, slope.	Slope.
Cn Coloso	Slight	Severe: hard to pack.	Floods, percs slowly, poor outlets.	Wetness, slow intake, percs slowly.	Percs slowly, wetness.	Percs slowly, wetness.
CoE, CoF Consejo	Severe: slope.	Slight	Not needed	Slow intake, slope.	Slope	Slope.
CpE, CpF Consumo	Severe: slope.	Severe: hard to pack.	Not needed	Slow intake, slope.	Slope	Slope.
CrC Corozal	Severe: slope.	Severe: hard to pack, wetness.	Percs slowly, wetness.	Slow intake, wetness, percs slowly.	Percs slowly, wetness.	Percs slowly, wetness.
CsC Corozo	Severe: seepage.	Severe: seepage, piping.	Not needed	Droughty, slope, seepage.	Too sandy, erodes easily.	Not needed.
CtB Coto	Moderate: seepage, slope.	Severe: hard to pack.	Not needed	Slow intake, slope.	Complex slope	Slope.
CtC Coto	Severe: slope.	Severe: hard to pack.	Not needed	Slow intake, slope.	Complex slope	Slope.
CuF Cuchillas	Severe: slope.	Severe: thin layer.	Not needed	Depth to rock, slope.	Depth to rock, rooting depth, slope.	Slope.
CvF*: Cuchillas	Severe: slope.	Severe: thin layer.	Not needed	Depth to rock, slope.	Depth to rock, rooting depth, slope.	Slope.
Rock outcrop.						
DaD2 Daguey	Severe: slope.	Severe: hard to pack.	Not needed	Slope	Slope	Slope.
EaB Espinosa	Moderate: seepage, slope.	Severe: hard to pack.	Not needed	Slope	Slope	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
EaC---------- Espinosa	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
EbB---------- Espinosa	Moderate: seepage, slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
EbC---------- Espinosa	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
EcB---------- Espinosa	Moderate: seepage, slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
EcC---------- Espinosa	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Favorable.
Ga---------- Garrochales	Slight---------	Severe: excess humus, wetness.	Floods, poor outlets, wetness.	Floods, wetness.	Not needed-----	Percs slowly, wetness.
GeC---------- Guerrero	Severe: seepage.	Severe: hard to pack.	Not needed-----	Droughty, fast intake, seepage.	Too sandy------	Not needed.
HD*. Hydraquents						
HmE, HmF---------- Humatas	Severe: slope.	Severe: hard to pack.	Not needed-----	Slow intake, slope.	Slope----------	Slope.
HS*. Hydraquents						
InD, InE---------- Ingenio	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Slope.
IsC---------- Islote	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Not needed-----	Slope, rooting depth.	Depth to rock, slope.	Favorable.
Ja---------- Jareales	Slight---------	Severe: excess humus, wetness.	Excess humus, floods, wetness.	Floods, percs slowly, wetness.	Not needed-----	Percs slowly, wetness.
JoC---------- Jobos	Moderate: slope.	Severe: hard to pack.	Percs slowly---	Complex slope, droughty, fast intake.	Percs slowly---	Droughty, percs slowly.
JuD2, JuE2-------- Juncal	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Slope.
LcE2, LcF2-------- Lirios	Severe: slope.	Slight---------	Not needed-----	Slope----------	Slope----------	Slope.
LgD, LgE, LgF----- Los Guineos	Severe: slope.	Severe: hard to pack.	Not needed-----	Slow intake, slope.	Slope----------	Slope.
LME*: Los Guineos------	Severe: slope.	Severe: hard to pack.	Not needed-----	Slow intake, slope.	Slope----------	Slope.
Maricao----------	Severe: slope.	Severe: hard to pack.	Not needed-----	Slow intake, slope.	Slope----------	Slope.
Rock outcrop.						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
MaF2---------- Maraguez	Severe: seepage, slope.	Severe: piping.	Not needed-----	Droughty, slope.	Slope----------	Slope.
McF---------- Maricao	Severe: slope.	Severe: hard to pack.	Not needed-----	Slow intake, slope.	Slope----------	Slope.
MmF*: Matanzas---------	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Not needed-----	Slope----------	Not needed-----	Favorable.
Rock outcrop.						
MnB---------- Matanzas	Moderate: seepage, depth to rock, slope.	Severe: hard to pack.	Not needed-----	Slope----------	Not needed-----	Favorable.
MoC2---------- Moca	Moderate: slope.	Severe: hard to pack.	Percs slowly---	Slow intake, slope.	Percs slowly, slope.	Slope.
MoD2, MoE2-------- Moca	Severe: slope.	Severe: hard to pack.	Percs slowly---	Slow intake, slope.	Percs slowly, slope.	Slope.
MpF2---------- Morado	Severe: seepage, slope.	Severe: thin layer.	Not needed-----	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope.
MuE, MuF---------- Mucara	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope, depth to rock.	Depth to rock, slope.	Slope, depth to rock.
NaD, NaE, NaF----- Naranjo	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope----------	Slope----------	Slope.
Pa---------- Palmar	Slight---------	Severe: excess humus, wetness.	Floods, poor outlets, wetness.	Floods, wetness.	Not needed-----	Percs slowly, wetness.
PeF---------- Pellejas	Severe: seepage, slope.	Severe: piping.	Not needed-----	Droughty, slope.	Slope----------	Droughty, erodes easily, slope.
PhC2, PhD2-------- Perchas	Severe: slope.	Severe: hard to pack.	Percs slowly---	Percs slowly, slope, slow intake.	Percs slowly, slope, wetness.	Percs slowly, wetness.
Ps*, Pt*. Pits						
Re---------- Reilly	Severe: seepage.	Severe: seepage.	Not needed-----	Droughty, fast intake, seepage.	Not needed-----	Not needed.
RlC---------- Rio Lajas	Severe: seepage.	Slight---------	Not needed-----	Droughty, fast intake, seepage.	Complex slope, too sandy.	Not needed.
Rm*. Riverwash						
Ro*, Rr*. Rock outcrop						
RsF*: Rock outcrop.						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
RsF*: San German	Severe: depth to rock, slope.	Severe: thin layer.	Not needed	Rooting depth, slope.	Depth to rock, slope.	Droughty, rooting depth, slope.
RtF*: Rock outcrop.						
Tanama	Severe: depth to rock, slope.	Severe: hard to pack.	Not needed	Complex slope, rooting depth.	Depth to rock, slope.	Rooting depth, slope.
SaB, Sabana Seca	Moderate: slope.	Severe: hard to pack.	Percs slowly, poor outlets, wetness.	Percs slowly, slow intake, wetness.	Percs slowly, poor outlets, wetness.	Percs slowly, wetness.
SgD, SgF, San German	Severe: depth to rock, slope.	Severe: thin layer.	Not needed	Rooting depth, slope.	Depth to rock, slope.	Droughty, rooting depth, slope.
SmF, San Sebastian	Severe: seepage, slope.	Slight	Not needed	Slope	Slope	Slope.
SnC, Santa Clara	Moderate: seepage, depth to rock, slope.	Moderate: hard to pack.	Not needed	Complex slope	Complex slope, depth to rock.	Favorable.
SoC, SoD, SoF, SpD, SpF, Soller	Severe: slope.	Severe: hard to pack.	Not needed	Complex slope, rooting depth.	Depth to rock, slope.	Slope, rooting depth.
SrF*: Soller	Severe: slope.	Severe: hard to pack.	Not needed	Complex slope, rooting depth.	Depth to rock, slope.	Slope, rooting depth.
Rock outcrop.						
TaB, Tanama	Severe: depth to rock.	Severe: hard to pack.	Not needed	Complex slope, rooting depth.	Depth to rock, slope.	Rooting depth, slope.
TaC2, TaD2, Tanama	Severe: depth to rock, slope.	Severe: hard to pack.	Not needed	Complex slope, rooting depth.	Depth to rock, slope.	Rooting depth, slope.
Tb, Tiburones	Severe: excess humus.	Severe: excess humus, wetness.	Floods, poor outlets, wetness.	Floods, wetness.	Not needed	Percs slowly, wetness.
To, Toa	Moderate: seepage.	Slight	Floods	Floods	Not needed	Favorable.
TP*. Tropopsamments						
Ur*. Urban land						
VaB, Vega Alta	Moderate: seepage, slope.	Severe: hard to pack.	Not needed	Slope, slow intake.	Slope	Favorable.
VaC2, Vega Alta	Severe: slope.	Severe: hard to pack.	Not needed	Slope, slow intake.	Slope	Favorable.
VcB, Vega Alta	Moderate: seepage, slope.	Severe: hard to pack.	Not needed	Slope, slow intake.	Slope	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
VcC2---------- Vega Alta	Severe: slope.	Severe: hard to pack.	Not needed-----	Slope, slow intake.	Slope----------	Favorable.
VeB---------- Vega Baja	Slight---------	Severe: wetness.	Floods, percs slowly.	Slow intake----	Complex slope, percs slowly.	Not needed.
Vg---------- Vigia	Slight---------	Severe: hard to pack, wetness.	Floods, percs slowly, poor outlets.	Wetness, floods.	Percs slowly, poor outlets.	Percs slowly, wetness.
Vm---------- Vivi	Severe: seepage.	Severe: piping.	Not needed-----	Seepage--------	Not needed-----	Not needed.
VoC2, VoD2, VoE2-- Voladora	Severe: slope.	Slight---------	Not needed-----	Slope----------	Slope----------	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
AaC----------	0-6	Sandy clay loam	SC	A-6	0	100	100	80-90	35-50	30-40	10-20
Aceitunas	6-65	Clay----------	MH	A-7	0	100	100	90-100	75-95	50-70	10-20
AcC----------	0-6	Clay----------	MH	A-7	0	100	100	90-100	75-95	50-70	10-20
Aceitunas	6-65	Clay----------	MH	A-7	0	100	100	90-100	75-95	50-70	10-20
AdF2----------	0-24	Clay----------	MH	A-7-5	0	100	100	90-100	75-95	50-70	10-20
Adjuntas	24-48	Weathered bedrock	---	---	---	---	---	---	---	---	---
AgC----------	0-32	Fine sand--------	SM	A-2	0	100	100	65-80	20-35	---	NP
Algarrobo	32-37	Sandy loam, loamy sand.	SM	A-2, A-4	0	100	100	50-70	15-40	---	NP
	37-68	Clay, sandy clay	MH	A-7	0	100	100	85-100	50-95	70-80	20-30
	68-80	Sandy clay loam	SC	A-6	0	100	100	80-90	36-50	30-40	11-18
AlB, AlC----------	0-6	Sandy loam-------	SM	A-2	0	100	100	60-70	30-40	---	NP
Almirante	6-64	Clay----------	MH	A-7	0	100	100	90-100	75-95	70-80	20-30
AmB, AmC----------	0-6	Sandy clay loam	CL	A-6, A-2	0	100	100	80-90	35-55	30-40	10-20
Almirante	6-64	Clay----------	MH	A-7	0	100	100	90-100	75-95	70-80	20-30
AnB, AnC----------	0-6	Clay----------	MH	A-7	0	100	100	90-100	75-95	70-80	20-30
Almirante	6-64	Clay----------	MH	A-7	0	100	100	90-100	75-95	70-80	20-30
AoD2, AoE2, AoF2--	0-60	Clay----------	MH	A-7	0	100	100	90-100	75-95	60-70	20-30
Alonso											
ArC----------	0-74	Fine sand--------	SM	A-2	0	100	100	65-80	20-35	---	NP
Arecibo	74-99	Stratified sand to sandy loam.	SM	A-2, A-4	0	100	100	60-75	20-40	---	NP
Ba----------	0-7	Clay----------	CH	A-7	0	100	100	90-100	75-95	70-80	45-55
Bajura	7-60	Clay----------	CH	A-7	0	100	100	90-100	75-95	70-80	45-55
BcB, BcC----------	0-11	Sandy loam-------	SM	A-2	0	100	100	60-70	30-40	---	NP
Bayamon	11-65	Clay----------	MH	A-7	0	100	100	90-100	75-95	50-60	10-20
BsB, BsC----------	0-11	Sandy clay loam	CL	A-6, A-2	0	100	100	80-90	35-50	30-40	10-20
Bayamon	11-65	Clay----------	MH	A-7	0	100	100	90-100	75-95	50-60	10-20
ByB, ByC----------	0-11	Clay----------	MH	A-7	0	100	100	90-100	75-95	50-60	10-20
Bayamon	11-65	Clay----------	MH	A-7	0	100	100	90-100	75-95	50-60	10-20
CaF----------	0-6	Clay loam--------	CL, SC	A-7	0	75-100	55-100	50-100	40-80	40-50	20-30
Caguabo	6-13	Gravelly clay loam, very gravelly silty clay loam.	GC, SC	A-2	0	40-80	25-55	22-55	18-50	30-40	10-15
	13-18	Weathered bedrock	---	---	---	---	---	---	---	---	---
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
CbF*:											
Caguabo----------	0-6	Clay loam--------	CL, SC	A-7	0	75-100	55-100	50-100	40-80	40-50	20-30
	6-13	Gravelly clay loam, very gravelly silty clay loam.	GC, SC	A-2	0	40-80	25-55	22-55	18-50	30-40	10-15
	13-18	Weathered bedrock	---	---	---	---	---	---	---	---	---
	18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
CcD, CcE--------- Caracoles	0-6 6	Loam---------- Unweathered bedrock.	ML, CL-ML ---	A-4 ---	0 ---	100 ---	100 ---	85-95 ---	60-75 ---	20-30 ---	2-7 ---
CeC---------- Carrizales	0-60	Fine sand---------	SM	A-2	0	100	100	65-80	20-35	---	NP
Cf---------- Catano	0-60	Sand----------	SP	A-2	0	100	100	50-70	5-15	---	NP
Cg*. Coastal beaches											
ClD2, ClE2, ClF2- Colinas	0-8 8-21 21-60	Clay loam--------- Clay loam--------- Marl----------	CL CL CL, CL-ML	A-6 A-6 A-4	0 0 0	90-100 90-100 90-100	75-100 75-100 75-90	70-100 70-100 70-85	55-80 55-80 65-70	30-40 30-40 20-30	15-20 15-20 4-10
CmF2---------- Colinas	0-8 8-21 21-60	Cobbly clay loam Clay loam--------- Marl----------	CL CL CL, CL-ML	A-6 A-6 A-4	30-65 0 0	80-100 90-100 90-100	70-100 75-100 75-90	65-100 70-100 70-85	50-80 55-80 65-70	30-40 30-40 20-30	15-20 15-20 4-10
Cn---------- Coloso	0-7 7-60	Silty clay-------- Silty clay loam, silty clay, clay.	MH, CH CL, MH, ML	A-7 A-7	0 0	100 100	100 100	95-100 95-100	90-95 85-95	50-70 40-70	25-35 20-35
CoE, CoF--------- Consejo	0-18 18-60	Clay---------- Clay loam, loam	MH CL	A-7 A-6, A-7	0 0	100 100	100 100	90-100 85-100	75-95 60-80	70-80 35-50	30-40 15-30
CpE, CpF--------- Consumo	0-18 18-50	Clay---------- Silty clay loam	MH MH	A-7 A-7	0 0	100 100	100 100	90-100 95-100	85-95 85-95	70-80 70-80	25-35 25-35
CrC---------- Corozal	0-6 6-41 41-60	Clay---------- Clay---------- Clay loam---------	MH MH CL	A-7 A-7 A-6	0 0 0	100 100 100	100 100 100	90-100 90-100 90-100	75-95 75-95 70-80	50-70 50-70 30-35	15-25 15-25 10-15
CsC---------- Corozo	0-18 18-24 24-33 33-60	Fine sand--------- Sandy loam, loamy sand. Clay, sandy clay Loamy sand, sandy loam, sandy clay loam.	SM SM MH SM	A-2 A-2, A-4 A-7 A-2	0 0 0 0	100 100 100 100	100 100 100 100	65-80 50-70 85-100 50-70	20-35 15-40 50-95 15-35	--- --- 70-80 ---	NP NP 20-30 NP
CtB, CtC--------- Coto	0-8 8-75	Clay---------- Clay----------	MH MH	A-7 A-7	0 0	100 100	100 100	90-100 90-100	75-95 75-95	60-70 60-70	20-30 20-30
CuF---------- Cuchillas	0-16 16-28 28	Silty clay loam Weathered bedrock Unweathered bedrock.	CL --- ---	A-7 --- ---	0 --- ---	100 --- ---	100 --- ---	95-100 --- ---	85-95 --- ---	40-50 --- ---	20-30 --- ---
CvF*: Cuchillas-------	0-16 16-28 28	Silty clay loam Weathered bedrock Unweathered bedrock.	CL --- ---	A-7 --- ---	0 --- ---	100 --- ---	100 --- ---	95-100 --- ---	85-95 --- ---	40-50 --- ---	20-30 --- ---
Rock outcrop.											
DaD2---------- Daguey	0-8 8-56 56-68	Clay---------- Clay---------- Silty clay loam	MH MH MH	A-7 A-7 A-7	0 0 0	100 100 100	100 100 100	90-100 90-100 85-95	75-95 75-95 70-90	70-80 70-80 70-80	25-35 25-35 25-35
EaB, EaC--------- Espinosa	0-10 10-66	Sandy loam------- Sandy clay, clay	SM MH, ML, CL, CH	A-2 A-6, A-7	0 0	100 100	100 100	60-70 85-100	20-35 50-95	--- 35-65	NP 15-30

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
EbB, EbC	0-10	Sandy clay loam	CL	A-6, A-2	0	100	100	80-90	35-50	30-40	10-20
Espinosa	10-66	Sandy clay, clay	MH, ML, CL, CH	A-6, A-7	0	100	100	85-100	50-95	35-65	15-30
EcB, EcC	0-10	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	20-30
Espinosa	10-66	Sandy clay, clay	MH, ML, CL, CH	A-6, A-7	0	100	100	85-100	50-95	35-65	15-30
Ga	0-74	Muck	Pt	A-8	0	---	---	---	---	---	NP
Garrochales											
GeC	0-24	Sand	SM, SP-SM	A-3, A-2	0	100	100	50-70	5-15	---	NP
Guerrero	24-43	Sandy clay	SC, CL	A-6	0	100	100	85-95	45-60	30-40	15-25
	43-58	Clay	CH	A-7	0	100	100	90-100	75-95	60-70	30-40
HD*.											
Hydraquents											
HmE, HmF	0-5	Clay	MH	A-7	0	100	100	90-100	85-95	70-80	30-35
Humatas	5-30	Clay	MH	A-7	0	100	100	90-100	85-95	70-80	30-35
	30-56	Silty clay loam	MH	A-7	0	100	100	95-100	85-95	60-70	25-30
HS*.											
Hydraquents											
InD, InE	0-6	Clay loam	CL	A-7	0	100	100	95-100	85-95	40-50	20-30
Ingenio	6-38	Silty clay, clay	MH	A-7	0	100	100	90-100	75-95	60-70	20-30
	38-60	Silty clay loam	CL-ML, ML	A-4	0	100	100	95-100	85-95	20-30	5-10
IsC	0-8	Sandy clay loam	SC, CL	A-6	0	100	100	80-90	36-55	20-30	10-15
Islote	8-30	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	20-30
	30	Weathered bedrock	---	---	---	---	---	---	---	---	---
Ja	0-28	Clay	CH	A-7	0	100	100	90-100	75-95	70-80	40-50
Jareales	28-60	Muck	Pt	A-8	0	---	---	---	---	---	NP
JoC	0-8	Sandy loam	SM	A-2, A-4	0	100	100	60-70	30-40	---	NP
Jobos	8-55	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	20-30
JuD2, JuE2	0-8	Clay	MH	A-7	0	100	100	90-100	75-95	70-80	30-40
Juncal	8-40	Clay	MH	A-7	0	100	100	90-100	75-95	70-80	30-40
	40-60	Silty clay loam	MH	A-7	0	100	100	95-100	85-95	60-70	20-25
LcE2, LcF2	0-6	Clay loam	CL	A-7	0	100	100	95-100	85-95	40-50	15-25
Lirios	6-24	Clay, silty clay	MH	A-7	0	100	100	90-100	75-95	60-70	25-30
	24-60	Silty clay loam	CL	A-7	0	100	100	95-100	85-95	40-50	15-25
LgD, LgE, LgF	0-6	Clay	MH	A-7	0	100	100	90-100	75-95	60-80	25-35
Los Guineos	6-62	Clay	MH	A-7	0	100	100	90-100	75-95	60-80	25-35
LME*:											
Los Guineos	0-6	Clay	MH	A-7	0	100	100	90-100	75-95	60-80	25-35
	6-62	Clay	MH	A-7	0	100	100	90-100	75-95	60-80	25-35
Maricao	0-20	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	25-30
	20-60	Silty clay loam, silty clay.	MH	A-7	0	100	100	95-100	85-95	50-60	15-20
Rock outcrop.											
MaF2	0-15	Silty clay loam	CL	A-7	0	95-100	90-100	85-100	75-95	40-50	20-30
Maraguez	15-21	Loam, clay loam, silty clay loam.	CL, CL-ML	A-4	0-5	90-95	85-90	75-90	60-70	20-30	5-10
	21-60	Loam, silt loam	CL, CL-ML	A-4	0-20	90-95	70-90	60-85	50-70	10-20	5-10
McF	0-20	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	25-30
Maricao	20-60	Silty clay loam, silty clay.	MH	A-7	0	100	100	95-100	85-95	50-60	15-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
MmF*:											
Matanzas	0-8	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	20-30
	8-42	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	20-30
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
MnB	0-8	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	20-30
Matanzas	8-42	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	20-30
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
MoC2, MoD2, MoE2-	0-60	Clay	MH	A-7	0	100	100	90-100	75-95	60-70	25-30
Moca											
MpF2	0-36	Clay loam	CL	A-7	0	100	100	90-100	70-80	40-50	20-30
Morado	36	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
MuE, MuF	0-6	Clay	CH	A-7	0	100	100	90-100	75-95	70-80	40-50
Mucara	6-13	Clay, silty clay	CH	A-7	0	100	100	90-100	75-95	70-80	40-50
	13-27	Weathered bedrock	---	---	---	---	---	---	---	---	---
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
NaD, NaE, NaF	0-60	Clay	MH	A-7	0	95-100	85-90	75-90	65-85	70-80	25-35
Naranjo											
Pa	0-75	Muck	Pt	A-8	---	---	---	---	---	---	NP
Palmar											
PeF	0-11	Clay loam	CL	A-7	0	100	100	85-100	60-80	40-50	20-30
Pellejas	11-62	Sandy loam, loamy sand.	SM	A-2	0	100	100	50-75	25-35	---	---
PhC2, PhD2	0-58	Clay	CH	A-7	0	100	100	90-100	75-95	80-90	50-60
Perchas											
Ps*, Pt*.											
Pits											
Re	0-7	Gravelly silt loam.	GM	A-4	0	60-70	50-60	40-50	35-40	---	---
Reilly	7-55	Stratified very gravelly sand to sand.	SP-SM, GW	A-1	0	20-55	10-50	5-35	0-8	---	---
RlC	0-17	Sand	SW-SM, SM, SP-SM	A-2, A-3	0	100	100	50-70	5-15	---	NP
Rio Lajas	17-26	Loamy sand	SM	A-2	0	100	100	50-75	15-30	---	NP
	26-77	Sandy loam	SM	A-2	0	100	100	60-70	30-35	---	NP
Rm*.											
Riverwash											
Ro*, Rr*.											
Rock outcrop											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
RsF*:											
Rock outcrop.											
San German	0-3	Gravelly clay loam.	GM	A-2	0	40-50	35-45	30-45	25-35	20-30	2-7
	3-10	Gravelly clay loam.	GM	A-2	0	40-50	35-45	30-45	25-35	20-30	2-7
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
RtF*:											
Rock outcrop.											
Tanama	0-5	Clay	MH	A-7	0-15	100	100	90-100	75-95	70-80	30-40
	5-16	Clay	MH	A-7	0-15	100	100	90-100	75-95	70-80	30-40
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SaB	0-70	Clay	MH	A-7	0	100	100	90-100	75-95	50-60	15-20
Sabana Seca											
SgD, SgF	0-3	Gravelly clay loam.	GM	A-2	0	40-50	35-45	30-45	25-35	20-30	2-7
San German	3-10	Gravelly clay loam.	GM	A-2	0	40-50	35-45	30-45	25-35	20-30	2-7
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SmF	0-6	Gravelly clay	GC, CL, SC, CL-ML	A-4	0	60-80	55-75	50-75	40-70	20-30	5-10
San Sebastian	6-55	Very gravelly clay.	GC, GM-GC	A-2	0	25-40	20-35	19-33	17-29	20-30	5-10
SnC	0-9	Clay	CH	A-7	0	100	100	90-100	75-95	50-60	30-40
Santa Clara	9-33	Silty clay	CH	A-7	0	100	100	95-100	90-95	50-60	30-40
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SoC, SoD, SoF	0-5	Clay	CH	A-7	0-10	100	100	90-100	75-95	70-80	40-50
Soller	5-25	Clay	CH	A-7	0-35	95-100	90-100	80-100	60-95	70-80	40-50
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SpD, SpF	0-5	Cobbly clay	CL, CH	A-7, A-6	20-35	95-100	90-95	80-95	60-95	30-80	15-50
Soller	5-25	Clay	CH	A-7	0-35	95-100	90-100	80-100	60-95	70-80	40-50
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
SrF*:											
Soller	0-5	Clay	CH	A-7	0-10	100	100	90-100	75-95	70-80	40-50
	5-25	Clay	CH	A-7	0-35	95-100	90-100	80-100	60-95	70-80	40-50
	25	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
TaB, TaC2, TaD2	0-5	Clay	MH	A-7	0-15	100	100	90-100	75-95	70-80	30-40
Tanama	5-16	Clay	MH	A-7	0-15	100	100	90-100	75-95	70-80	30-40
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Tb---------- Tiburones	0-84	Muck----------	Pt	---	---	---	---	---	---	---	NP
To---------- Toa	0-18	Silty clay loam	CL	A-6	0	100	100	95-100	85-95	30-40	15-20
	18-63	Silty clay loam, silty clay, clay loam.	CL	A-6	0	100	100	90-100	70-95	30-40	15-20
TP*. Tropopsamments											
Ur*. Urban land											
VaB, VaC2-------- Vega Alta	0-8	Sandy clay loam	CL	A-6, A-2	0	100	100	80-90	35-50	30-40	10-20
	8-70	Clay----------	MH	A-7	0	100	100	90-100	75-95	70-80	25-35
VcB, VcC2-------- Vega Alta	0-8	Clay----------	MH	A-7	0	100	100	90-100	75-95	70-80	25-35
	8-70	Clay----------	MH	A-7	0	100	100	90-100	75-95	70-80	25-35
VeB---------- Vega Baja	0-8	Clay----------	CH	A-7	0	100	95-100	90-100	75-95	70-80	40-50
	8-48	Silty clay, clay	CH	A-7	0	100	95-100	90-100	75-95	70-80	40-50
	48-70	Silty clay, clay	CH	A-7	0	100	100	90-100	75-95	70-80	40-50
Vg---------- Vigia	0-18	Muck----------	Pt	A-8	---	---	---	---	---	---	NP
	18-60	Clay----------	CH	A-7	0	100	100	90-100	75-95	70-80	40-50
Vm---------- Vivi	0-14	Loam----------	ML, SM	A-2, A-4	0	100	100	60-95	30-75	---	NP
	14-25	Very fine sandy loam, loam.	ML	A-4	0	100	100	85-95	50-75	---	NP
	25-60	Coarse sand------	SP-SM, SM	A-1, A-2	0	100	85-100	45-65	5-15	---	NP
VoC2, VoD2, VoE2- Voladora	0-33	Clay----------	MH	A-7	0	100	100	90-100	75-95	70-80	25-35
	33-50	Clay loam--------	CL	A-6	0	100	100	90-100	70-80	30-40	15-20

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cm³	In/hr	In/in	pH	Mmhos/cm				Pct
AaC----------	0-6	25-35	1.35-1.40	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low----------	0.02	5	1-4
Aceitunas	6-65	55-75	1.15-1.55	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low----------	0.02		
AcC----------	0-6	50-70	1.30-1.40	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low----------	0.02	5	2-5
Aceitunas	6-65	55-75	1.15-1.55	0.6-2.0	0.10-0.15	3.6-5.5	<2	Low----------	0.02		
AdF2----------	0-24	40-55	1.0-1.5	0.6-2.0	0.15-0.20	3.6-5.5	<2	Moderate-----	0.10	4	3-7
Adjuntas	24-48	---	---	---	---	---	---	----------	----		
AgC----------	0-32	0-2	1.45-1.60	>0.2	0.05-0.08	3.6-5.5	<2	Very low-----	0.10	5	1-2
Algarrobo	32-37	5-20	1.60-1.85	6.0-20	0.06-0.13	3.6-5.5	<2	Very low-----	0.10		
	37-68	35-45	1.60-1.65	0.06-0.2	0.14-0.17	3.6-5.5	<2	Moderate-----	0.10		
	68-80	25-35	1.55-1.65	0.06-0.2	0.14-0.16	3.6-5.5	<2	Low----------	0.10		
AlB, AlC----------	0-6	10-20	1.40-1.50	2.0-6.0	0.06-0.08	3.6-5.5	<2	Low----------	0.10	5	2-4
Almirante	6-64	70-85	1.00-1.50	0.6-2.0	0.10-0.15	3.6-5.5	<2	Moderate-----	0.10		
AmB, AmC----------	0-6	25-35	1.35-1.40	0.6-2.0	0.10-0.15	3.6-5.5	<2	Moderate-----	0.10	5	2-5
Almirante	6-64	70-85	1.00-1.50	0.6-2.0	0.10-0.15	3.6-5.5	<2	Moderate-----	0.10		
AnB, AnC----------	0-6	65-80	1.25-1.30	0.6-2.0	0.10-0.15	3.6-5.5	<2	Moderate-----	0.10	5	2-5
Almirante	6-64	70-85	1.00-1.50	0.6-2.0	0.10-0.15	3.6-5.5	<2	Moderate-----	0.10		
AoD2, AoE2, AoF2-	0-60	55-80	1.45-1.75	0.6-2.0	0.15-0.20	4.5-5.5	<2	Moderate-----	0.02	5	3-6
Alonso											
ArC----------	0-74	0-2	1.45-1.60	>20	0.02-0.05	3.6-5.5	<2	Very low-----	0.10	5	1-2
Arecibo	74-99	4-8	1.60-1.80	>20	0.02-0.05	3.6-5.5	<2	Very low-----	0.10		
Ba----------	0-7	40-65	1.25-1.35	0.06-0.2	0.15-0.20	6.1-7.3	<2	High---------	0.24	5	2-5
Bajura	7-60	40-70	1.30-1.40	0.06-0.2	0.15-0.20	6.1-7.3	<2	High---------	0.24		
BcB, BcC----------	0-11	14-20	1.40-1.50	2.0-6.0	0.06-0.08	4.5-5.5	<2	Low----------	0.02	5	1-2
Bayamon	11-65	65-75	1.35-1.50	0.6-2.0	0.10-0.15	4.5-5.5	<2	Low----------	0.02		
BsB, BsC----------	0-11	25-35	1.35-1.40	0.6-2.0	0.10-0.15	4.5-5.5	<2	Low----------	0.02	5	1-3
Bayamon	11-65	65-75	1.35-1.50	0.6-2.0	0.10-0.15	4.5-5.5	<2	Low----------	0.02		
ByB, ByC----------	0-11	65-70	1.35-1.50	0.6-2.0	0.10-0.15	4.5-5.5	<2	Low----------	0.02	5	1-3
Bayamon	11-65	65-75	1.35-1.50	0.6-2.0	0.10-0.15	4.5-5.5	<2	Low----------	0.02		
CaF----------	0-6	27-40	1.30-1.35	0.6-2.0	0.10-0.15	6.1-6.5	<2	Moderate-----	0.24	3	1-3
Caguabo	6-13	27-40	1.30-1.35	0.6-2.0	0.05-0.07	6.1-6.5	<2	Low----------	0.24		
	13-18	---	---	---	---	---	---	----------	----		
	18	---	---	---	---	---	---	----------	----		
CbF*:											
Caguabo----------	0-6	27-40	1.30-1.35	0.6-2.0	0.10-0.15	6.1-6.5	<2	Moderate-----	0.24	3	1-3
	6-13	27-40	1.30-1.35	0.6-2.0	0.05-0.07	6.1-6.5	<2	Low----------	0.24		
	13-18	---	---	---	---	---	---	----------	----		
	18	---	---	---	---	---	---	----------	----		
Rock outcrop.											
CcD, CcE----------	0-6	10-20	1.35-1.40	0.6-6.0	0.05-0.10	6.6-7.3	<2	Low----------	0.24	2	2-4
Caracoles	6	---	---	---	---	---	---	----------	----		
CeC----------	0-60	0-4	1.55-1.60	6.0-20	0.04-0.08	4.5-5.5	<2	Very low-----	0.10	5	1-4
Carrizales											
Cf----------	0-60	1-3	1.50-1.60	>20.0	<0.05	7.9-8.4	<2	Very low-----	0.10	5	1-3
Catano											

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cm³	In/hr	In/in	pH	Mmhos/cm				Pct
Cg*. Coastal beaches											
ClD2, ClE2, ClF2- Colinas	0-8	28-35	1.30-1.40	0.6-2.0	0.18-0.20	7.9-8.4	<2	Moderate	0.17	3	5-10
	8-21	27-35	1.30-1.40	0.6-2.0	0.18-0.20	7.9-8.4	<2	Moderate	0.17		
	21-60	---	---	---	---	---	---	---	---		
CmF2 Colinas	0-8	28-35	1.30-1.40	0.6-2.0	0.09-0.16	7.9-8.4	<2	Moderate	0.17	3	5-10
	8-21	27-35	1.30-1.40	0.6-2.0	0.18-0.20	7.9-8.4	<2	Moderate	0.17		
	21-60	---	---	---	---	---	---	---	---		
Cn Coloso	0-7	40-55	1.30-1.35	0.2-0.6	0.12-0.16	5.6-7.3	<2	High	0.24	5	2-4
	7-60	45-55	1.25-1.30	0.06-0.2	0.12-0.18	5.6-7.3	<2	High	0.24		
CoE, CoF Consejo	0-18	50-65	1.20-1.25	0.6-2.0	0.15-0.21	3.6-5.0	<2	Moderate	0.10	5	1-4
	18-60	30-40	1.25-1.30	0.6-2.0	0.16-0.21	3.6-5.0	<2	Moderate	0.10		
CpE, CpF Consumo	0-18	55-65	1.20-1.30	0.6-2.0	0.12-0.18	4.5-5.0	<2	Moderate	0.10	5	1-4
	18-50	30-35	1.30-1.40	0.6-2.0	0.10-0.16	4.5-5.0	<2	Moderate	0.10		
CrC Corozal	0-6	40-50	1.20-1.30	0.06-0.2	0.15-0.20	3.6-5.0	<2	Moderate	0.17	5	2-4
	6-41	40-70	1.25-1.30	0.06-0.2	0.15-0.20	3.6-5.0	<2	Moderate	0.17		
	41-60	30-40	1.25-1.45	0.6-2.0	0.10-0.15	3.6-5.0	<2	Moderate	0.17		
CsC Corozo	0-18	0-1	1.40-1.45	>20.0	0.05-0.08	3.6-5.5	<2	Very low	0.02	5	1-3
	18-24	5-26	1.45-1.80	6.0-20.0	0.06-0.13	3.6-5.5	<2	Very low	0.02		
	24-33	35-60	1.60-1.65	0.06-0.2	0.15-0.20	3.6-5.5	<2	Moderate	0.02		
	33-60	15-35	1.80-1.85	6.0-20.0	0.02-0.05	3.6-5.5	<2	Very low	0.02		
CtB, CtC Coto	0-8	65-75	1.30-1.40	0.6-2.0	0.15-0.20	4.5-5.5	<2	Moderate	0.02	5	2-5
	8-75	65-85	1.25-1.45	0.6-2.0	0.15-0.20	4.5-5.5	<2	Moderate	---		
CuF Cuchillas	0-16	30-40	1.30-1.35	0.6-2.0	0.15-0.20	4.5-5.5	<2	Moderate	0.10	3	1-3
	16-28	---	---	---	---	---	---	---	---		
	28	---	---	---	---	---	---	---	---		
CvF*: Cuchillas	0-16	30-40	1.30-1.35	0.6-2.0	0.15-0.20	4.5-5.0	<2	Moderate	0.10	3	1-3
	16-28	---	---	---	---	---	---	---	---		
	28	---	---	---	---	---	---	---	---		
Rock outcrop.											
DaD2 Daguey	0-8	55-65	1.10-1.20	0.6-2.0	0.15-0.20	4.5-5.5	<2	Moderate	0.02	5	2-6
	8-56	65-80	1.25-1.30	0.6-2.0	0.15-0.20	4.5-5.5	<2	Moderate	0.02		
	56-68	35-40	1.10-1.20	0.6-2.0	0.10-0.15	4.5-5.5	<2	Moderate	0.02		
EaB, EaC Espinosa	0-10	10-20	1.40-1.50	2.0-6.0	0.06-0.08	4.5-5.5	<2	Low	0.10	5	2-4
	10-66	70-85	1.25-1.50	0.6-2.0	0.14-0.17	4.5-5.5	<2	Moderate	0.10		
EbB, EbC Espinosa	0-10	25-35	1.35-1.45	0.6-2.0	0.10-0.15	4.5-5.5	<2	---	0.10	5	2-4
	10-66	70-85	1.25-1.50	0.6-2.0	0.14-0.17	4.5-5.5	<2	Moderate	0.10		
EcB, EcC Espinosa	0-10	70-80	1.25-1.30	0.6-2.0	0.14-0.17	4.5-5.5	<2	Moderate	0.10	5	2-3
	10-66	70-85	1.25-1.50	0.6-2.0	0.14-0.17	4.5-5.5	<2	Moderate	0.10		
Ga Garrochales	0-74	0	0.60-0.75	0.06-0.2	0.15-0.20	5.1-6.5	<2	Low	---	---	30-60
GeC Guerrero	0-24	1-4	1.55-1.60	>20.0	<0.05	5.6-6.0	<2	Low	0.10	5	1-4
	24-43	35-50	1.45-1.60	0.6-2.0	0.10-0.15	5.1-5.5	<2	Moderate	0.10		
	43-58	45-65	1.45-1.55	0.2-0.6	0.15-0.20	4.5-5.5	<2	Moderate	0.10		
HD*. Hydraquents											

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cm³	In/hr	In/in	pH	Mmhos/cm				Pct
HmE, HmF--------- Humatas	0-5 5-30 30-56	55-65 45-75 27-35	1.20-1.25 1.15-1.20 1.10-1.20	0.6-2.0 0.6-2.0 0.6-2.0	0.12-0.18 0.12-0.18 0.10-0.16	4.5-5.5 4.5-5.5 4.5-5.5	<2 <2 <2	Moderate---- Moderate---- Moderate----	0.02 0.02 0.02	5	1-4
HS*. Hydraquents											
InD, InE--------- Ingenio	0-6 6-38 38-60	30-40 40-55 40-60	1.35-1.40 1.35-1.40 1.35-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.10-0.15 0.10-0.15 0.10-0.15	4.5-5.0 4.5-5.0 4.5-5.0	<2 <2 <2	Moderate---- Moderate---- Low---------	0.02 0.02 0.02	5	2-4
IsC-------------- Islote	0-8 8-30 30	25-35 50-65 ---	1.35-1.40 1.30-1.35 ---	2.0-6.0 0.6-2.0 ---	0.10-0.15 0.10-0.15 ---	5.6-7.3 6.1-7.3 ---	<2 <2 ---	Low--------- Moderate---- ----------	0.17 0.17 ----	4	1-4
Ja--------------- Jareales	0-28 28-60	40-65 0	1.25-1.30 0.35-0.65	<0.06 0.06-0.2	0.20-0.25 0.15-0.20	6.6-7.3 6.1-6.5	<2 <2	High-------- Very low----	0.24 0.24	3	5-9
JoC-------------- Jobos	0-8 8-55	10-20 45-70	1.35-1.40 1.45-1.60	6.0-20.0 0.06-0.2	<0.05 0.10-0.15	5.1-5.5 5.1-5.5	<2 <2	Very low---- Moderate----	0.17 0.17	4	1-4
JuD2, JuE2------- Juncal	0-8 8-40 40-60	40-50 45-55 29-40	1.25-1.30 1.30-1.35 1.30-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.15-0.20 0.15-0.20 0.15-0.20	5.6-6.5 7.4-8.4 8.5-9.0	<2 <2 <2	Moderate---- Moderate---- Moderate----	0.17 0.17 0.17	4	4-8
LcE2, LcF2------- Lirios	0-6 6-24 24-60	32-40 44-65 30-40	1.30-1.40 1.35-1.45 1.30-1.40	0.6-2.0 0.6-2.0 0.6-2.0	0.15-0.20 0.15-0.20 0.15-0.20	4.5-5.5 4.5-5.5 4.5-5.5	<2 <2 <2	Moderate---- Moderate---- Moderate----	0.10 0.10 0.10	5	2-4
LgD, LgE, LgF---- Los Guineos	0-6 6-62	45-60 45-60	1.20-1.30 1.20-1.30	0.6-2.0 0.6-2.0	0.15-0.17 0.15-0.17	3.6-5.0 3.6-5.0	<2 <2	Moderate---- Moderate----	0.10 0.10	5	3-7
LME*: Los Guineos----- Maricao--------- Rock outcrop.	0-6 6-62 0-20 20-60	45-60 45-60 60-65 30-50	1.20-1.30 1.20-1.30 1.20-1.30 1.20-1.30	0.6-2.0 0.6-2.0 0.6-2.0 0.6-2.0	0.15-0.17 0.15-0.17 0.15-0.20 0.10-0.15	3.6-5.0 3.6-5.0 3.6-5.0 3.6-5.0	<2 <2 <2 <2	Moderate---- Moderate---- Moderate---- Moderate----	0.10 0.10 0.10 0.10	5 5	3-7 1-4
MaF2------------- Maraguez	0-15 15-21 21-60	28-35 28-35 10-20	1.30-1.40 1.30-1.40 1.30-1.45	0.6-2.0 0.6-2.0 2.0-6.0	0.10-0.15 0.05-0.10 0.05-0.10	5.6-6.5 5.6-6.5 5.6-6.5	<2 <2 <2	Moderate---- Low--------- Low---------	0.10 0.10 0.10	4	2-4
McF-------------- Maricao	0-20 20-60	60-65 30-50	1.20-1.30 1.20-1.30	0.6-2.0 0.6-2.0	0.15-0.20 0.10-0.15	3.6-5.0 3.6-5.0	<2 <2	Moderate---- Moderate----	0.10 0.10	5	1-4
MmF*: Matanzas-------- Rock outcrop.	0-8 8-42 42	40-55 75-90 ---	1.35-1.60 1.40-1.60 ---	0.6-2.0 0.6-2.0 ---	0.15-0.20 0.15-0.20 ---	5.6-7.3 5.6-7.3 ---	<2 <2 ---	Moderate---- Moderate---- ----------	0.02 0.02 ----	5	2-5
MnB-------------- Matanzas	0-8 8-42 42	40-55 75-90 ---	1.35-1.60 1.40-1.60 ---	0.6-2.0 0.6-2.0 ---	0.15-0.20 0.15-0.20 ---	5.6-7.3 5.6-7.3 ---	<2 <2 ---	Moderate---- Moderate---- ----------	0.02 0.02 ----	5	2-5
MoC2, MoD2, MoE2- Moca	0-60	55-65	1.30-1.40	0.2-0.6	0.20-0.24	4.5-5.0	<2	High--------	0.17	5	1-4
MpF2------------- Morado	0-36 36	28-35 ---	1.30-1.40 ---	0.6-2.0 ---	0.10-0.15 ---	6.1-7.3 ---	<2 ---	Moderate---- ----------	0.10 ----	3	2-4

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cm^3	In/hr	In/in	pH	Mmhos/cm				Pct
MuE, MuF--------- Mucara	0-6 6-13 13-27 27	40-45 40-55 --- ---	1.35-1.45 1.35-1.45 --- ---	0.6-2.0 0.6-2.0 --- ---	0.15-0.17 0.15-0.17 --- ---	5.6-7.3 5.6-7.3 --- ---	<2 <2 --- ---	High-------- High-------- ---------- ----------	0.10 0.10 ---- ----	3	2-6
NaD, NaE, NaF---- Naranjo	0-60	40-50	1.25-1.35	0.6-2.0	0.15-0.20	7.9-8.4	<2	Moderate----	0.17	3	2-5
Pa---------- Palmar	0-75	0	0.60-0.75	0.06-0.2	0.15-0.20	6.1-7.3	<2	Low---------	----	---	33-56
PeF---------- Pellejas	0-11 11-62	29-35 10-15	1.30-1.40 1.50-1.60	0.6-2.0 6.0-20	0.16-0.21 0.06-0.13	4.5-5.5 4.5-5.5	<2 <2	Moderate---- Low---------	0.17 0.17	3	2-5
PhC2, PhD2------- Perchas	0-58	55-65	1.30-1.45	0.06-0.2	0.15-0.20	4.5-5.5	<2	High--------	0.24	5	1-4
Ps*, Pt*. Pits											
Re---------- Reilly	0-7 7-55	8-15 3-5	1.50-1.60 1.45-1.60	6.0-20 >20	<0.05 <0.05	5.6-6.5 5.6-6.5	<2 <2	Very low---- Very low----	0.10 0.10	3	2-5
RlC---------- Rio Lajas	0-17 17-26 26-77	1-2 1-2 6-10	1.50-1.50 1.55-1.50 1.55-1.70	>0.20 6.0-20 6.0-20	<0.05 <0.05 <0.05	6.1-6.5 6.1-6.5 6.1-6.5	<2 <2 <2	Low--------- Low--------- Low---------	0.10 0.10 0.10	5	<.5
Rm*. Riverwash											
Ro*, Rr*. Rock outcrop											
RsF*: Rock outcrop.											
San German------ 	0-3 3-10 10	27-35 27-35 ---	1.40-1.50 1.40-1.50 ---	6.0-20 6.0-20 ---	0.05-0.10 0.05-0.10 ---	7.4-8.4 7.4-8.4 ---	<2 <2 ---	Low--------- Low--------- ----------	0.24 0.24 ----	3	2-4
RtF*: Rock outcrop.											
Tanama---------- 	0-5 5-16 16	55-65 60-70 ---	1.30-1.45 1.35-1.50 ---	0.6-2.0 0.6-2.0 ---	0.15-0.20 0.15-0.20 ---	6.1-6.5 6.1-6.5 ---	<2 <2 ---	Moderate---- Moderate---- ----------	0.24 0.24 ----	2	2-4
SaB---------- Sabana Seca	0-70	55-80	1.35-1.45	<0.06	0.15-0.20	4.5-5.0	<2	Moderate----	0.17	3	3-6
SgD, SgF--------- San German	0-3 3-10 10	27-35 27-35 ---	1.40-1.50 1.40-1.50 ---	6.0-20 6.0-20 ---	0.05-0.10 0.05-0.10 ---	7.4-8.4 7.4-8.4 ---	<2 <2 ---	Low--------- Low--------- ----------	0.24 0.24 ----	3	2-4
SmF---------- San Sebastian	0-6 6-55	45-50 45-60	1.35-1.50 1.40-1.50	0.6-2.0 0.6-2.0	0.15-0.20 0.15-0.20	7.4-8.4 7.4-8.4	<2 <2	Low--------- Low---------	0.17 0.17	3	1-4
SnC---------- Santa Clara	0-9 9-33 33	40-65 45-60 ---	1.30-1.45 1.30-1.40 ---	0.6-2.0 0.6-2.0 ---	0.15-0.20 0.20-0.25 ---	6.1-7.3 7.4-7.8 ---	<2 <2 ---	Moderate---- Moderate---- ----------	0.17 0.17 ----	3	2-4
SoC, SoD, SoF---- Soller	0-5 5-25 25	40-65 50-65 ---	1.25-1.35 1.25-1.40 ---	0.6-2.0 0.6-2.0 ---	0.20-0.25 0.18-0.20 ---	6.6-8.4 6.6-8.4 ---	<2 <2 ---	High-------- High-------- ----------	0.17 0.17 ----	3	4-9

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay <2mm	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Organic matter
									K	T	
	In	Pct	G/cm³	In/hr	In/in	pH	Mmhos/cm				Pct
SpD, SpF---------	0-5	40-60	1.30-1.40	0.6-2.0	0.10-0.20	7.9-8.4	<2	Moderate----	0.17	3	4-9
Soller	5-25	50-65	1.25-1.40	0.6-2.0	0.18-0.20	7.9-8.4	<2	High--------	0.17		
	25	---	---	---	---	---	---	----------	----		
SrF*:											
Soller----------	0-5	40-65	1.25-1.35	0.6-2.0	0.20-0.25	7.9-8.4	<2	High--------	0.17	3	4-9
	5-25	50-65	1.25-1.40	0.6-2.0	0.18-0.20	7.9-8.4	<2	High--------	0.17		
	25	---	---	---	---	---	---	----------	----		
Rock outcrop.											
TaB, TaC2, TaD2--	0-5	55-65	1.30-1.45	0.6-2.0	0.15-0.20	6.1-6.5	<2	Moderate----	0.24	2	2-4
Tanama	5-16	60-70	1.35-1.50	0.6-2.0	0.15-0.20	6.1-7.3	<2	Moderate----	0.24		
	16	---	---	---	---	---	---	----------	----		
Tb----------	0-84	0	0.35-0.65	0.06-0.2	0.15-0.20	4.5-7.3	<2	Low---------	----	---	35-60
Tiburones											
To----------	0-18	28-40	1.35-1.55	0.6-2.0	0.15-0.20	5.1-7.3	<2	Moderate----	0.17	5	1-4
Toa	18-63	29-35	1.35-1.50	0.6-2.0	0.15-0.20	5.1-7.3	<2	Moderate----	0.17		
TP*.											
Tropopsamments											
Ur*.											
Urban land											
VaB, VaC2--------	0-8	25-35	1.35-1.40	0.6-2.0	0.10-0.15	3.6-5.5	<2	Moderate----	0.10	5	1-4
Vega Alta	8-70	40-55	1.20-1.30	0.6-2.0	0.15-0.20	3.6-5.5	<2	Moderate----	0.10		
VcB, VcC2--------	0-8	45-55	1.20-1.30	0.6-2.0	0.10-0.15	3.6-5.5	<2	Moderate----	0.10	5	2-4
Vega Alta	8-70	40-55	1.20-1.30	0.6-2.0	0.15-0.20	3.6-5.5	<2	Moderate----	0.10		
VeB----------	0-8	40-65	1.35-1.50	0.06-0.2	0.15-0.20	5.1-7.3	<2	High--------	0.24	5	2-5
Vega Baja	8-48	50-70	1.30-1.45	0.06-0.2	0.15-0.20	5.1-7.3	<2	High--------	0.24		
	48-70	50-70	1.30-1.40	0.06-0.2	0.15-0.20	5.1-7.3	<2	High--------	0.24		
Vg----------	0-18	0	0.60-0.75	0.6-2.0	0.15-0.20	5.6-6.5	<2	Low---------	0.24	3	33-56
Vigia	18-60	45-70	1.20-1.30	0.06-0.2	0.15-0.20	5.1-6.5	<2	High--------	0.24		
Vm----------	0-14	10-20	1.40-1.50	2.0-6.0	0.11-0.18	4.5-5.5	<2	Very low----	0.10	3	2-4
Vivi	14-25	8-25	1.40-1.50	2.0-6.0	0.15-0.18	4.5-5.5	<2	Very low----	0.10		
	25-60	5-10	1.45-1.60	6.0-20.0	0.04-0.08	4.5-5.5	<2	Very low----	0.10		
VoC2, VoD2, VoE2-	0-33	60-70	1.25-1.35	0.6-2.0	0.15-0.20	3.6-5.5	<2	Moderate----	0.02	5	2-4
Voladora	33-50	30-40	1.25-1.35	0.6-2.0	0.15-0.20	3.6-5.5	<2	Moderate----	0.02		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the text explain terms such as "brief," "apparent," and "perched." The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AaC, AcC---------- Aceitunas	B	None--------	---	---	>6.0	---	---	>60	---	High------	High.
AdF2---------- Adjuntas	C	None--------	---	---	>6.0	---	---	48-60	Soft	High------	High.
AgC---------- Algarrobo	A	None--------	---	---	>6.0	---	---	>60	---	High------	High.
AlB, AlC, AmB, AmC, AnB, AnC---- Almirante	B	None--------	---	---	>6.0	---	---	>60	---	High------	High.
AoD2, AoE2, AoF2-- Alonso	B	None--------	---	---	>6.0	---	---	>60	---	High------	High.
ArC---------- Arecibo	A	None--------	---	---	>6.0	---	---	>60	---	Low-------	High.
Ba---------- Bajura	D	Frequent----	Brief-----	Jul-Sep	0.5-2.5	Apparent	Jul-Sep	>60	---	High------	Moderate.
BcB, BcC, BsB, BsC, ByB, ByC---- Bayamon	B	None--------	---	---	>6.0	---	---	>60	---	High------	Moderate.
CaF---------- Caguabo	D	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
CbF*: Caguabo----------	D	None--------	---	---	>6.0	---	---	10-20	Hard	Moderate	Low.
Rock outcrop.											
CcD, CcE---------- Caracoles	D	None--------	---	---	>6.0	---	---	4-8	Hard	Low-------	Low.
CeC---------- Carrizales	A	None--------	---	---	>6.0	---	---	>60	---	Low-------	High.
Cf---------- Catano	A	None--------	---	---	>6.0	---	---	>60	---	Low-------	Low.
Cg*. Coastal beaches											
ClD2, ClE2, ClF2, CmF2---------- Colinas	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.
Cn---------- Coloso	D	Frequent----	Brief-----	Jul-Sep	2.0-4.0	Apparent	Jul-Sep	>60	---	High------	Low.
CoE, CoF---------- Consejo	C	None--------	---	---	>6.0	---	---	>60	---	High------	High.
CpE, CpF---------- Consumo	B	None--------	---	---	>6.0	---	---	>60	---	High------	High.
CrC---------- Corozal	C	None--------	---	---	0-1.0	Perched	Jul-Oct	>60	---	High------	High.
CsC---------- Corozo	A	None--------	---	---	>6.0	---	---	>60	---	High------	High.

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
CtB, CtC---------- Coto	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
CuF---------- Cuchillas	D	None--------	---	---	>6.0	---	---	20-36	Soft	Moderate	High.
CvF*: Cuchillas--------	D	None--------	---	---	>6.0	---	---	20-36	Soft	Moderate	High.
Rock outcrop.											
DaD2---------- Daguey	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
EaB, EaC, EbB, EbC, EcB, EcC---- Espinosa	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Ga---------- Garrochales	D	Frequent----	Very long	Jul-Oct	0-2.5	Apparent	Jul-Oct	>60	---	Moderate	Low.
GeC---------- Guerrero	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
HD*. Hydraquents											
HmE, HmF---------- Humatas	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
HS*. Hydraquents											
InD, InE---------- Ingenio	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
IsC---------- Islote	B	None--------	---	---	>6.0	---	---	21-35	Soft	High-----	Moderate.
Ja---------- Jareales	D	Common------	Long------	Jul-Oct	0-2.5	Apparent	Jul-Oct	>60	---	High-----	Moderate.
JoC---------- Jobos	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
JuD2, JuE2-------- Juncal	C	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
LcE2, LcF2-------- Lirios	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
LgD, LgE, LgF----- Los Guineos	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
LME*: Los Guineos------	C	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Maricao----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Rock outcrop.											
MaF2---------- Maraguez	B	None--------	---	---	>6.0	---	---	>60	---	Moderate	Low.
McF---------- Maricao	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
MmF*: Matanzas---------	B	None--------	---	---	>6.0	---	---	30-60	Hard	High-----	Low.
Rock outcrop.											

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
MnB---------- Matanzas	B	None--------	---	---	>6.0	---	---	30-60	Hard	High-----	Low.
MoC2, MoD2, MoE2-- Moca	D	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
MpF2---------- Morado	C	None--------	---	---	>6.0	---	---	22-42	Soft	Moderate	Low.
MuE, MuF---------- Mucara	D	None--------	---	---	>6.0	---	---	20-36	Soft	High-----	Low.
NaD, NaE, NaF----- Naranjo	C	None--------	---	---	>6.0	---	---	>60	---	High-----	Low.
Pa---------- Palmar	D	Frequent----	Very long	Jul-Oct	0-2.5	Apparent	Jul-Oct	>60	---	Moderate	Low.
PeF---------- Pellejas	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
PhC2, PhD2-------- Perchas	D	None--------	---	---	>6.0	---	---	>60	---	High-----	High.
Ps*, Pt*. Pits											
Re---------- Reilly	A	Occasional	Very brief	Aug-Oct	2.5-5.0	Apparent	Aug-Oct	>60	---	Low------	Moderate.
RlC---------- Rio Lajas	A	None--------	---	---	>6.0	---	---	>60	---	Low------	Low.
Rm*. Riverwash											
Ro*, Rr*. Rock outcrop											
RsF*: Rock outcrop.											
San German-------	D	None--------	---	---	>6.0	---	---	5-14	Hard	Low------	Low.
RtF*: Rock outcrop.											
Tanama----------	D	None--------	---	---	>6.0	---	---	12-20	Hard	High-----	Low.
SaB---------- Sabana Seca	D	None--------	---	---	2.0-3.0	Apparent	Jul-Oct	>60	---	High-----	High.
SgD, SgF---------- San German	D	None--------	---	---	>6.0	---	---	5-14	Hard	Low------	Low.
SmF---------- San Sebastian	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Low.
SnC---------- Santa Clara	C	None--------	---	---	>6.0	---	---	24-40	---	High-----	Low.
SoC, SoD, SoF, SpD, SpF---------- Soller	D	None--------	---	---	>6.0	---	---	20-34	Hard	High-----	Low.
SrF*: Soller----------	D	None--------	---	---	>6.0	---	---	20-34	Hard	High-----	Low.
Rock outcrop.											

See footnote at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
TaB, TaC2, TaD2--- Tanama	D	None--------	---	---	>6.0	---	---	12-20	Hard	High-----	Low.
Tb---------- Tiburones	D	Frequent----	Very long	Jul-Oct	0-2.5	Apparent	Jul-Oct	>60	---	Moderate	Moderate.
To---------- Toa	B	Occasional	Brief-----	Jul-Oct	>6.0	---	---	>60	---	Moderate	Low.
TP*. Tropopsamments											
Ur*. Urban land											
VaB, VaC2, VcB, VcC2---------- Vega Alta	C	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
VeB---------- Vega Baja	C	Occasional	Brief-----	Jul-Sep	1.5-3.0	Apparent	Jul-Sep	>60	---	High-----	High.
Vg---------- Vigia	D	Frequent----	Very long	Jul-Oct	0-2.5	Apparent	Jul-Oct	>60	---	High-----	Low.
Vm---------- Vivi	B	Occasional	Very brief	Jul-Oct	>6.0	---	---	>60	---	Moderate	High.
VoC2, VoD2, VoE2-- Voladora	B	None--------	---	---	>6.0	---	---	>60	---	High-----	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Aceitunas	Clayey, oxidic, isohyperthermic Typic Palehumults
Adjuntas	Fine, kaolinitic, isohyperthermic Typic Humitropepts
Algarrobo*	Coarse-loamy, siliceous, isohyperthermic Entic Haplohumods
Almirante	Clayey, oxidic, isohyperthermic Plinthic Paleudults
Alonso	Clayey, oxidic, isohyperthermic Orthoxic Tropohumults
Arecibo**	Sandy, siliceous, isohyperthermic Grossarenic Entic Haplohumods
Bajura	Fine, mixed, nonacid, isohyperthermic Vertic Tropaquepts
Bayamon	Clayey, oxidic, isohyperthermic Typic Haplorthox
Caguabo	Loamy-skeletal, mixed, isohyperthermic Lithic Eutropepts
Caracoles	Loamy, mixed, isohyperthermic Lithic Ustorthents
Carrizales	Isohyperthermic coated Typic Quartzipsmments
Catano	Carbonatic, isohyperthermic Typic Tropopsamments
Colinas	Fine-loamy, carbonatic, isohyperthermic Eutropeptic Rendolls
Coloso	Fine, mixed, nonacid, isohyperthermic Aeric Tropic Fluvaquents
Consejo	Clayey, mixed, isohyperthermic Typic Tropudults
Consumo	Clayey, mixed, isohyperthermic Dystropeptic Tropudults
Corozal	Clayey, mixed, isohyperthermic Typic Tropohumults
Corozo	Sandy over clayey, siliceous, isohyperthermic Orthoxic Tropudults
Coto	Clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox
Cuchillas	Loamy, mixed, isothermic, shallow Typic Humitropepts
Daguey	Clayey, oxidic, isohyperthermic Orthoxic Tropohumults
Espinosa	Clayey, mixed, isohyperthermic Typic Paleudults
Garrochales	Marly, euic, isohyperthermic Limnic Troposaprists
Guerrero	Clayey, oxidic, isohyperthermic Arenic Plinthic Paleudults
Humatas	Clayey, kaolinitic, isohyperthermic Typic Tropohumults
Hydraquents	Hydraquents
Ingenio	Clayey, mixed, isohyperthermic Typic Tropudults
Islote	Very fine, mixed, isohyperthermic Typic Tropudalfs
Jareales	Fine, mixed, nonacid, isohyperthermic Thapto-Histic Tropic Fluvaquents
Jobos	Clayey, oxidic, isohyperthermic Plinthaquic Paleudults
Juncal	Fine, mixed, isohyperthermic Typic Tropudalfs
Lirios	Clayey over loamy, mixed, isohyperthermic Typic Tropudults
Los Guineos	Clayey, mixed, isothermic Epiaquic Tropohumults
Maraguez	Fine-loamy, mixed, isohyperthermic Typic Eutropepts
Maricao	Clayey, mixed, isothermic Dystropeptic Tropudults
Matanzas	Clayey, oxidic, isohyperthermic Tropeptic Eutrorthox
Moca	Clayey, mixed, isohyperthermic Vertic Tropudults
Morado	Fine-loamy, mixed, isohyperthermic Typic Eutropepts
Mucara	Fine montmorillonitic, isohyperthermic, paralithic Vertic Eutropepts
Naranjo	Fine, mixed, isohyperthermic Eutropeptic Rendolls
Palmar	Euic, isohyperthermic Typic Troposaprists
Pellejas	Fine-loamy over sandy or sandy-skeletal, mixed, isohyperthermic Typic Dystropepts
Perchas	Fine, mixed, acid, isohyperthermic Typic Tropaquepts
Psamments	Psamments
Reilly	Sandy-skeletal, mixed, isohyperthermic Mollic Fluvaquents
Rio Lajas***	Coarse-loamy, mixed, isohyperthermic Typic Tropudalfs
Sabana Seca	Clayey, mixed, isohyperthermic Plinthic Iropaquults
San German	Loamy-skeletal, carbonatic, isohyperthermic Lithic Ustorthents
San Sebastian	Clayey-skeletal, carbonatic, isohyperthermic Typic Tropudalfs
Santa Clara	Fine, mixed, isohyperthermic Typic Eutropepts
Soller	Clayey, mixed, isohyperthermic, shallow Typic Rendolls
Tanama	Clayey, mixed, isohyperthermic Lithic Tropudalfs
Tiburones	Euic, isohyperthermic Typic Troposaprists
Toa	Fine, mixed, isohyperthermic Fluventic Hapludolls
Vega Alta	Clayey, mixed, isohyperthermic Plinthic Paleudults
Vega Baja	Fine, mixed, isohyperthermic Aeric Tropaqualfs
Vigia	Fine, mixed, nonacid, isohyperthermic Histic Tropaquepts
Vivi	Coarse-loamy, mixed, isohyperthermic Fluventic Hapludolls
Voladora	Clayey, oxidic, isohyperthermic Typic Rhodudults

*An Arenic Entic subgroup of Tropohumods has been proposed as an amendment to Soil Taxonomy (4). Provisionally, the classification is coarse-loamy, siliceous, isohyperthermic Arenic Entic Tropohumods.

**A Grossarenic Entic subgroup has been proposed as an amendment to Soil Taxonomy (4). Provisionally, the classification is sandy, siliceous, isohyperthermic Grossarenic Entic Tropohumods.

***An Arenic subgroup has not yet been described in Soil Taxonomy (4), but it is implied from item "e," page 136. Provisionally, the classification is loamy, mixed, isohyperthermic Arenic Tropudalfs.

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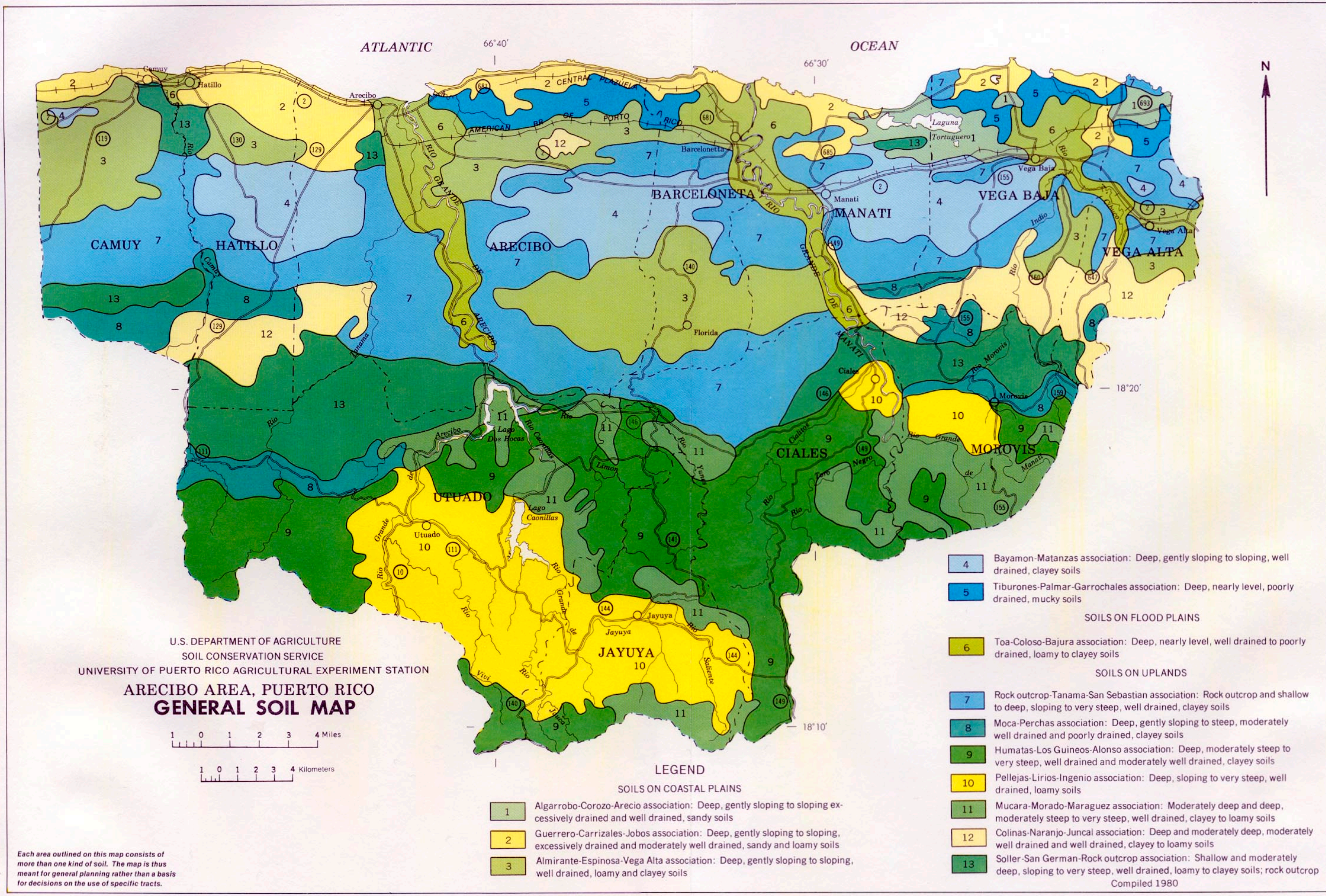
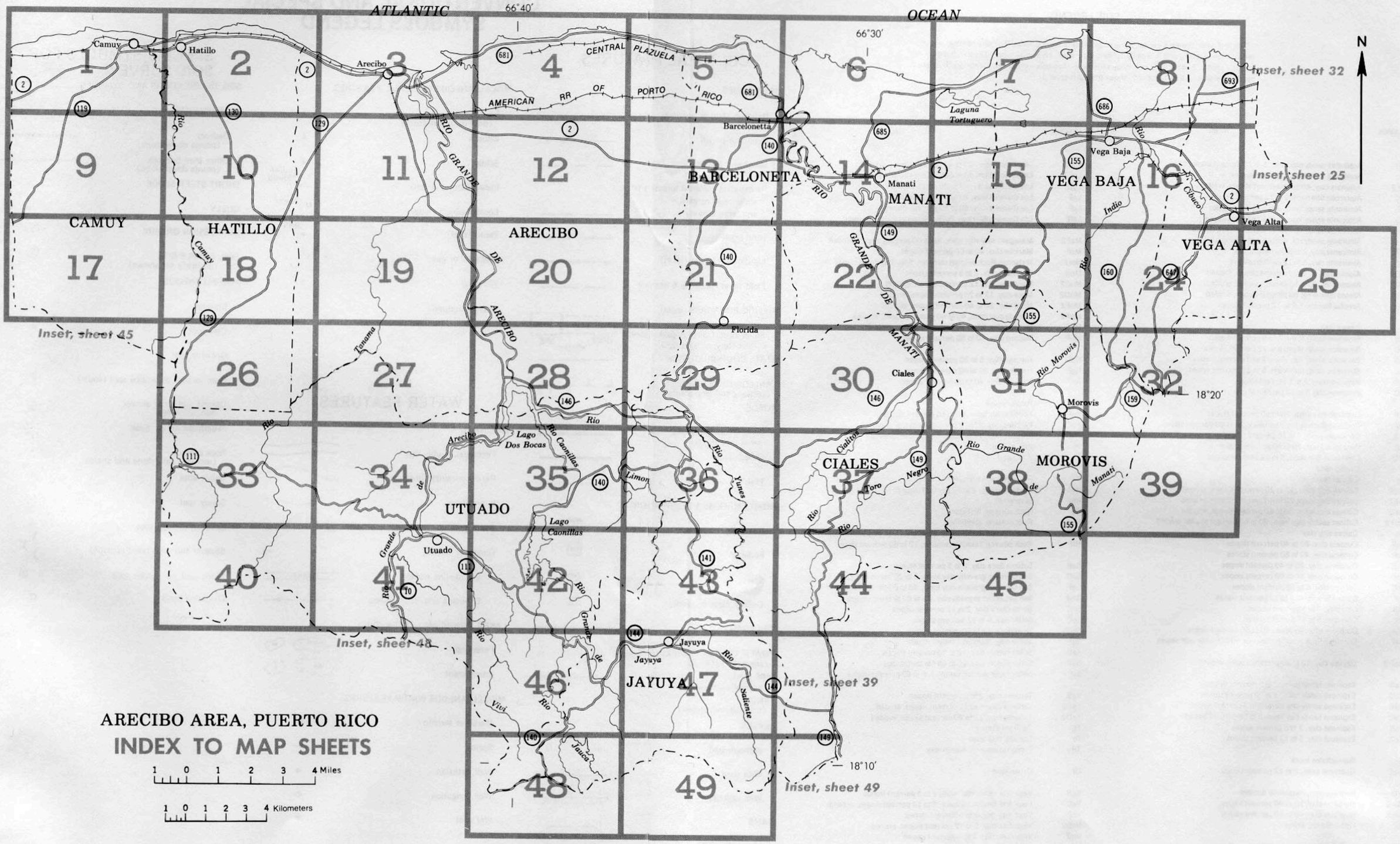

ATLANTIC
OCEAN
66°40′
66°30′
N
18°20′
18°10′
CAMUY
HATILLO
ARECIBO
BARCELONETA
MANATI
VEGA BAJA
VEGA ALTA
CIALES
MOROVIS
UTUADO
JAYUYA
Camuy
Hatillo
Arecibo
Barceloneta
Manati
Vega Baja
Vega Alta
Florida
Ciales
Morovis
Utuado
Jayuya
Laguna Tortuguero
Lago Dos Bocas
Lago Caonillas
CENTRAL PLAZUELA
AMERICAN RR OF PORTO RICO
Rio Grande de Arecibo
Rio Grande de Manati
Rio Tanama
Rio Camuy
Rio Caonillas
Rio Limon
Rio Yunes
Rio Cialitos
Rio Toro Negro
Rio Indio
Rio Morovis
Rio Grande de Jayuya
Rio Saliente
Rio Vivi
Rio Jauca
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF PUERTO RICO AGRICULTURAL EXPERIMENT STATION
ARECIBO AREA, PUERTO RICO
GENERAL SOIL MAP
1 0 1 2 3 4 Miles
1 0 1 2 3 4 Kilometers
LEGEND
SOILS ON COASTAL PLAINS
1 Algarrobo-Corozo-Arecio association: Deep, gently sloping to sloping excessively drained and well drained, sandy soils
2 Guerrero-Carrizales-Jobos association: Deep, gently sloping to sloping, excessively drained and moderately well drained, sandy and loamy soils
3 Almirante-Espinosa-Vega Alta association: Deep, gently sloping to sloping, well drained, loamy and clayey soils
4 Bayamon-Matanzas association: Deep, gently sloping to sloping, well drained, clayey soils
5 Tiburones-Palmar-Garrochales association: Deep, nearly level, poorly drained, mucky soils
SOILS ON FLOOD PLAINS
6 Toa-Coloso-Bajura association: Deep, nearly level, well drained to poorly drained, loamy to clayey soils
SOILS ON UPLANDS
7 Rock outcrop-Tanama-San Sebastian association: Rock outcrop and shallow to deep, sloping to very steep, well drained, clayey soils
8 Moca-Perchas association: Deep, gently sloping to steep, moderately well drained and poorly drained, clayey soils
9 Humatas-Los Guineos-Alonso association: Deep, moderately steep to very steep, well drained and moderately well drained, clayey soils
10 Pellejas-Lirios-Ingenio association: Deep, sloping to very steep, well drained, loamy soils
11 Mucara-Morado-Maraguez association: Moderately deep and deep, moderately steep to very steep, well drained, clayey to loamy soils
12 Colinas-Naranjo-Juncal association: Deep and moderately deep, moderately well drained and well drained, clayey to loamy soils
13 Soller-San German-Rock outcrop association: Shallow and moderately deep, sloping to very steep, well drained, loamy to clayey soils; rock outcrop
Compiled 1980
Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



ARECIBO AREA, PUERTO RICO

INDEX TO MAP SHEETS

1 0 1 2 3 4 Miles

1 0 1 2 3 4 Kilometers

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool (Davis Airstrip; FLOOD POOL LINE)

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEMS & DESIGNATIONS

- Interstate (79)
- Federal (410)
- State (52)
- County, farm or ranch (378)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small (water; w)

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (GAS)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) (CANAL)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial (water; w)
- Intermittent (int; i)

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (CeA; FoB2)

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Oxidation pond

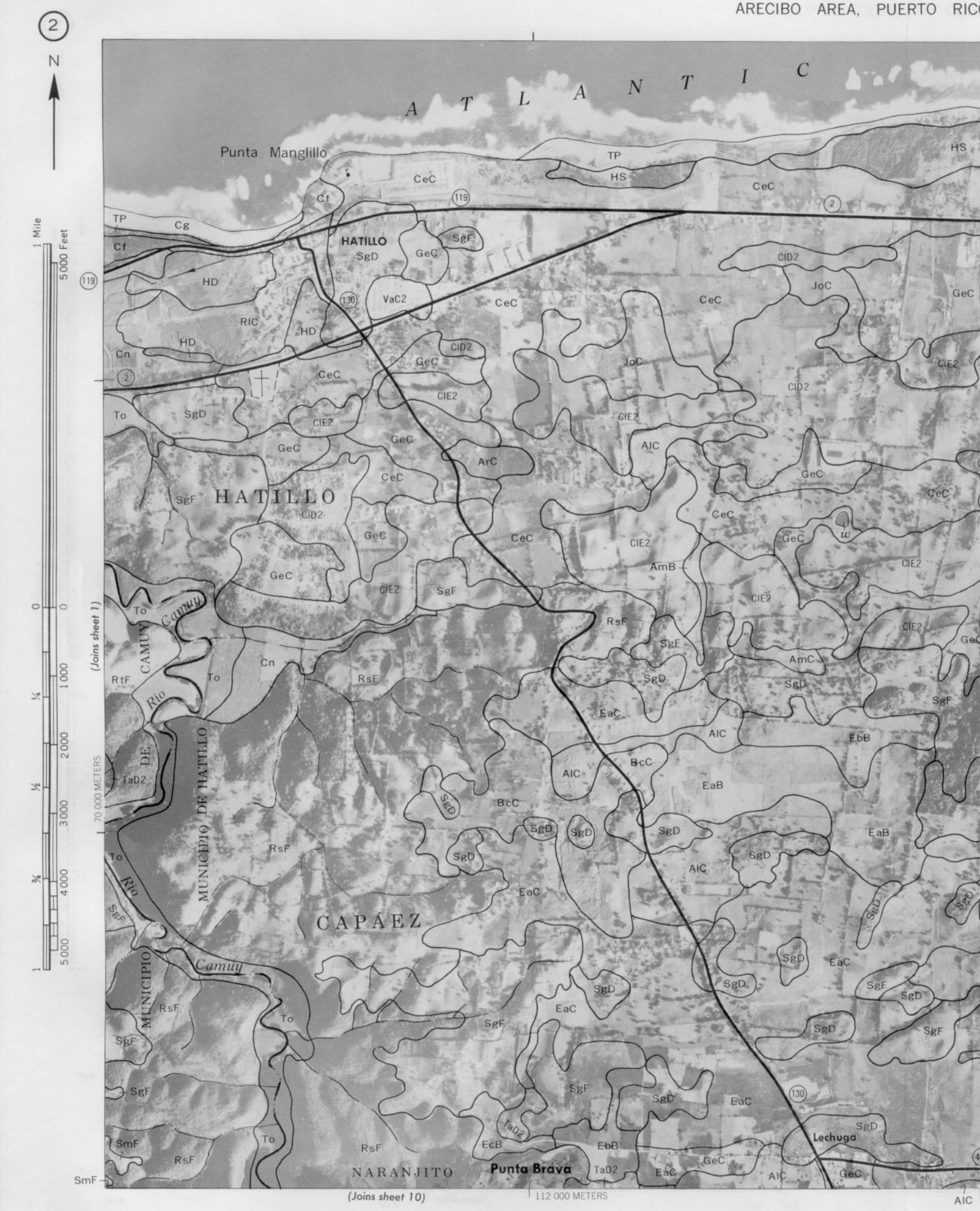
SOIL LEGEND

The first letter, always a capital, is the initial letter of the soil name. The second letter is a capital if the mapping unit is broadly defined; otherwise, it is a small letter. The third letter, always a capital, A, B, C, D, E, or F, shows the slope. Symbols without slope letter are those of nearly level soils. A final number 2, shows the soil is eroded.

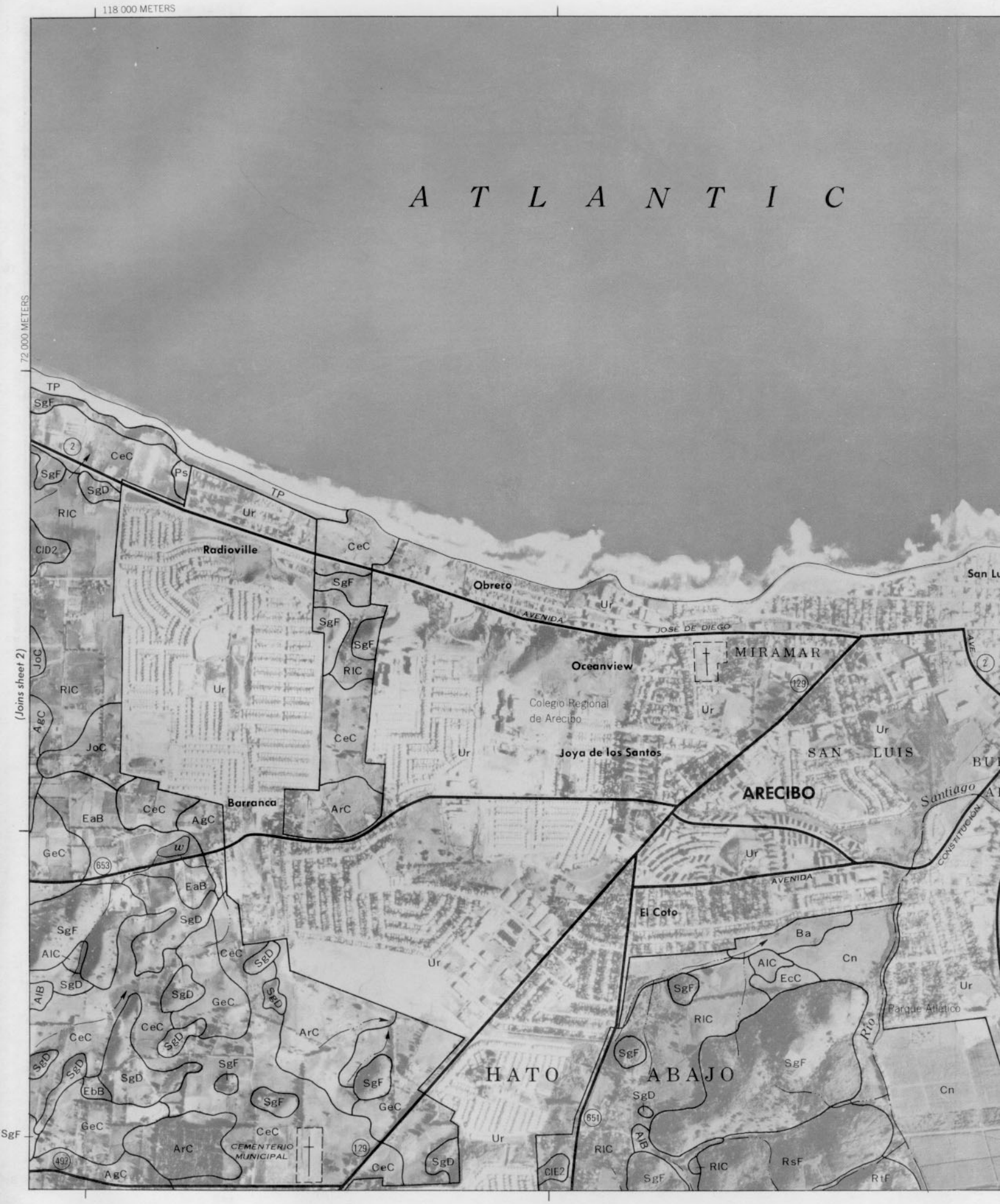
SYMBOL	NAME
AaC	Aceitunas sandy clay loam, 5 to 12 percent slopes
AcC	Aceitunas clay, 5 to 12 percent slopes
AdF2	Adjuntas clay, 40 to 60 percent slopes, eroded
AgC	Algarrobo fine sand, 2 to 12 percent slopes
AlB	Almirante sandy loam, 2 to 5 percent slopes
AlC	Almirante sandy loam, 5 to 12 percent slopes
AmB	Almirante sandy clay loam, 2 to 5 percent slopes
AmC	Almirante sandy clay loam, 5 to 12 percent slopes
AnB	Almirante clay, 2 to 5 percent slopes
AnC	Almirante clay, 5 to 12 percent slopes
AoD2	Alonso clay, 12 to 20 percent slopes, eroded
AoE2	Alonso clay, 20 to 40 percent slopes, eroded
AoF2	Alonso clay, 40 to 60 percent slopes, eroded
ArC	Arecibo fine sand, 2 to 12 percent slopes
Ba	Bajura clay
BcB	Bayamon sandy loam, 2 to 5 percent slopes
BcC	Bayamon sandy loam, 5 to 12 percent slopes
BsB	Bayamon sandy clay loam, 2 to 5 percent slopes
BsC	Bayamon sandy clay loam, 5 to 12 percent slopes
ByB	Bayamon clay, 2 to 5 percent slopes
ByC	Bayamon clay 5 to 12 percent slopes
CaF	Caguabo clay loam, 20 to 60 percent slopes
CbF	Caguabo-Rock outcrop complex, 20 to 60 percent slopes
CcD	Caracoles loam, 5 to 20 percent slopes
CcE	Caracoles loam, 20 to 40 percent slopes
CeC	Carrizales fine sand, 2 to 12 percent slopes
Cf	Catano sand
Cg	Coastal beaches
CID2	Colinas clay loam, 12 to 20 percent slopes, eroded
CIE2	Colinas clay loam, 20 to 40 percent slopes, eroded
CIF2	Colinas clay loam, 40 to 60 percent slopes, eroded
CmF2	Colinas cobbly clay loam, 20 to 60 percent slopes, eroded
Cn	Coloso silty clay
CoE	Consejo clay, 20 to 40 percent slopes
CoF	Consejo clay, 40 to 60 percent slopes
CpE	Consumo clay, 20 to 40 percent slopes
CpF	Consumo clay, 40 to 60 percent slopes
CrC	Corozal clay, 5 to 12 percent slopes
CsC	Corozo fine sand, 2 to 12 percent slopes
CtB	Coto clay, 2 to 5 percent slopes
CtC	Coto clay, 5 to 12 percent slopes
CuF	Cuchillas silty clay loam, 40 to 60 percent slopes
CvF	Cuchillas-Rock outcrop complex, 40 to 60 percent slopes
DaD2	Daguey clay, 12 to 20 percent slopes, eroded
EaB	Espinosa sandy loam, 2 to 5 percent slopes
EaC	Espinosa sandy loam, 5 to 12 percent slopes
EbB	Espinosa sandy clay loam, 2 to 5 percent slopes
EbC	Espinosa sandy clay loam, 5 to 12 percent slopes
EcB	Espinosa clay, 2 to 5 percent slopes
EcC	Espinosa clay, 5 to 12 percent slopes
Ga	Garrochales muck
GeC	Guerrero sand, 2 to 12 percent slopes
HD	Hydraquents, frequently flooded
HmE	Humatas clay, 20 to 40 percent slopes
HmF	Humatas clay, 40 to 60 percent slopes
HS	Hydraquents, saline
InD	Ingenio clay loam, 5 to 20 percent slopes
InE	Ingenio clay loam, 20 to 40 percent slopes
IsC	Islote sandy clay loam, 2 to 12 percent slopes
Ja	Jareales clay
JoC	Jobos sandy loam, 2 to 12 percent slopes
JuD2	Juncal clay, 12 to 20 percent slopes, eroded
JuE2	Juncal clay, 20 to 40 percent slopes, eroded
LcE2	Lirios clay loam, 20 to 40 percent slopes, eroded
LcF2	Lirios clay loam, 40 to 60 percent slopes, eroded
LgD	Los Guineos clay, 12 to 20 percent slopes
LgE	Los Guineos clay, 20 to 40 percent slopes
LgF	Los Guineos clay, 40 to 60 percent slopes
LME	Los Guineos-Maricao-Rock outcrop association, steep
MaF2	Maraguez silty clay loam, 40 to 60 percent slopes, eroded
McF	Maricao clay, 40 to 60 percent slopes
MmF	Matanzas-Rock outcrop complex, 5 to 60 percent slopes
MnB	Matanzas clay, 2 to 5 percent slopes
MoC2	Moca clay, 2 to 12 percent slopes, eroded
MoD2	Moca clay, 12 to 20 percent slopes, eroded
MoE2	Moca clay, 20 to 40 percent slopes, eroded
MpF2	Morado clay loam, 40 to 60 percent slopes, eroded
MuE	Mucara clay, 20 to 40 percent slopes
MuF	Mucara clay, 40 to 60 percent slopes
NaD	Naranjo clay, 5 to 20 percent slopes
NaE	Narnjo clay, 20 to 40 percent slopes
NaF	Naranjo clay, 40 to 60 percent slopes
Pa	Palmar muck
PeF	Pellejas clay loam, 40 to 60 percent slopes
PhC2	Perchas clay, 2 to 12 percent slopes, eroded
PhD2	Perchas clay, 12 to 20 percent slopes, eroded
Ps	Pits, gravel
Pt	Pits, sand
Re	Reilly gravelly silt loam
RIC	Rio Lajas sand, 2 to 12 percent slopes
Rm	Riverwash
Ro	Rock outcrop, limestone
Rr	Rock outcrop, sandstone
RsF	Rock outcrop-San German complex, 20 to 60 percent slopes
RtF	Rock outcrop-Tanama complex, 12 to 60 percent slopes
SaB	Sabana Seca clay, 2 to 5 percent slopes
SgD	San German gravelly clay loam, 5 to 20 percent slopes
SgF	San German gravelly clay loam, 20 to 60 percent slopes
SmF	San Sebastian gravelly clay, 20 to 60 percent slopes
SnC	Santa Clara clay, 2 to 12 percent slopes
SoC	Soller clay, 5 to 12 percent slopes
SoD	Soller clay, 12 to 20 percent slopes
SoF	Soller clay, 20 to 60 percent slopes
SpD	Soller cobbly clay, 12 to 20 percent slopes
SpF	Soller cobbly clay, 20 to 60 percent slopes
SrF	Soller-Rock outcrop complex, 5 to 60 percent slopes
TaB	Tanama clay, 2 to 5 percent slopes
TaC2	Tanama clay, 5 to 12 percent slopes, eroded
TaD2	Tanama clay, 12 to 20 percent slopes, eroded
Tb	Tiburones muck
To	Toa silty clay loam
TP	Tropopsamments, hummocky
Ur	Urban land
VaB	Vega Alta sandy clay loam, 2 to 5 percent slopes
VaC2	Vega Alta sandy clay loam, 5 to 12 percent slopes, eroded
VcB	Vega Alta clay, 2 to 5 percent slopes
VcC2	Vega Alta clay, 5 to 12 percent slopes, eroded
VeB	Vega Baja clay, 2 to 5 percent slopes
Vg	Vigia muck
Vm	Vivi loam
VoC2	Voladora clay, 5 to 12 percent slopes, eroded
VoD2	Voladora clay, 12 to 20 percent slopes, eroded
VoE2	Voladora clay, 20 to 40 percent slopes, eroded

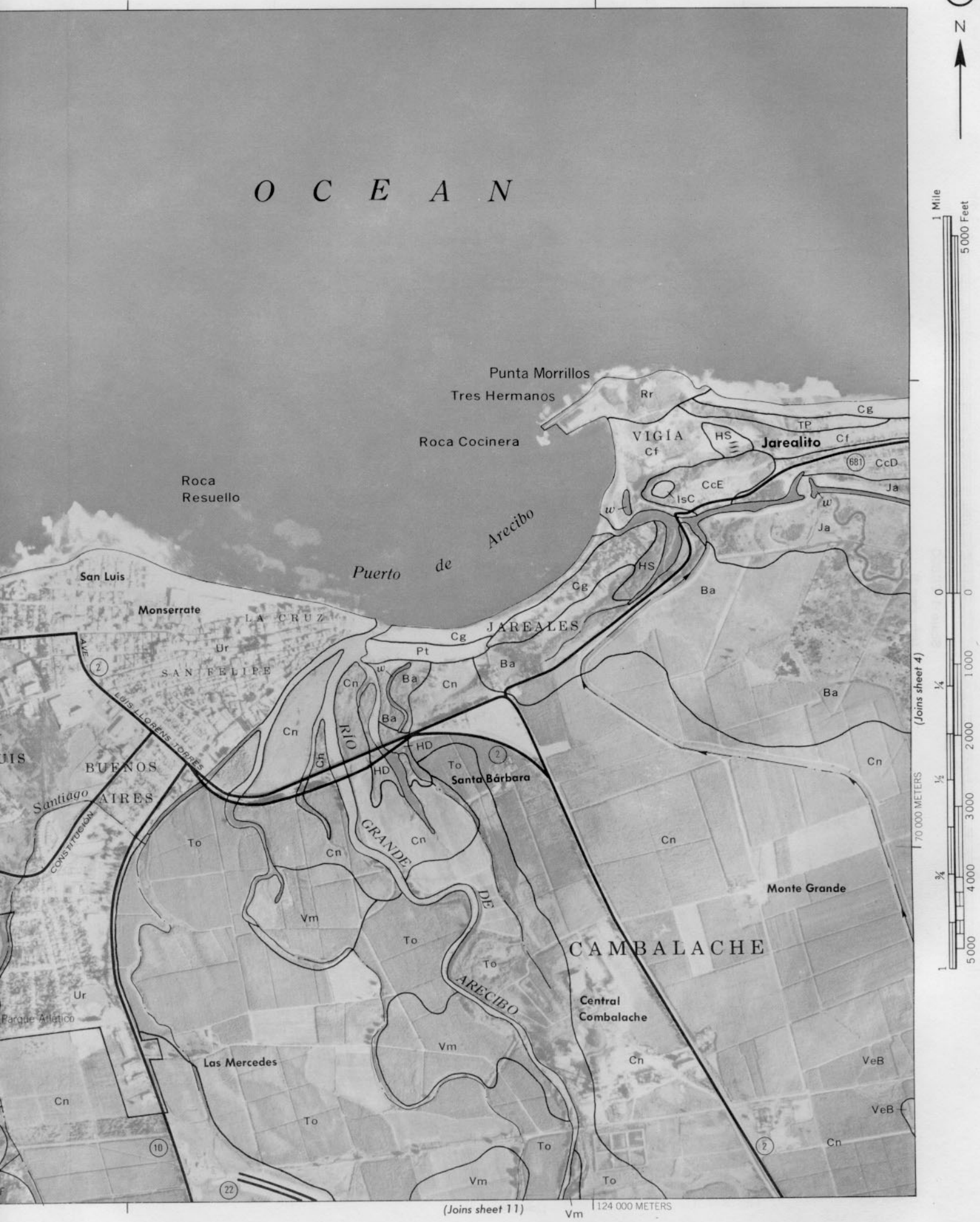

104 000 METERS
72 000 METERS
A T L A N T I C
Punta Puntilla
MEMBRILLO
YEGUADA
CAMUY ARRIBA
Yeguada
Membrillo
Monte Iguina
Palomar
SURVEY
SOIL
OF
LIMIT
485
119
2


O C E A N
Punta Peñón
CAMUY
Maracayo
PUENTE
Alcantarilla
La Pica
Pueblo Nuevo
Alianza
Z A N J A
MUN DE CAMUY
MUN DE HATILLO
Río Camuy
(119)
(2)
(486)
(Joins sheet 2)
(Joins sheet 9)
1 Mile
5000 Feet
170 000 METERS
110 000 METERS
N


2
N
A T L A N T I C
Punta Manglillo
HATILLO
HATILLO
CAPÁEZ
NARANJITO
MUNICIPIO DE HATILLO
MUNICIPIO
CAMUY
Camuy
Río
Punta Brava
Lechuga
TP
HS
Cf
Cg
CeC
SgD
SgF
GeC
HD
RIC
VaC2
Cn
CID2
JoC
CIE2
To
ArC
AIC
AmB
RsF
AmC
EaC
EbB
BcC
EaB
TaD2
EcB
SmF
1 Mile
5000 Feet
70 000 METERS
112 000 METERS
(Joins sheet 1)
(Joins sheet 10)

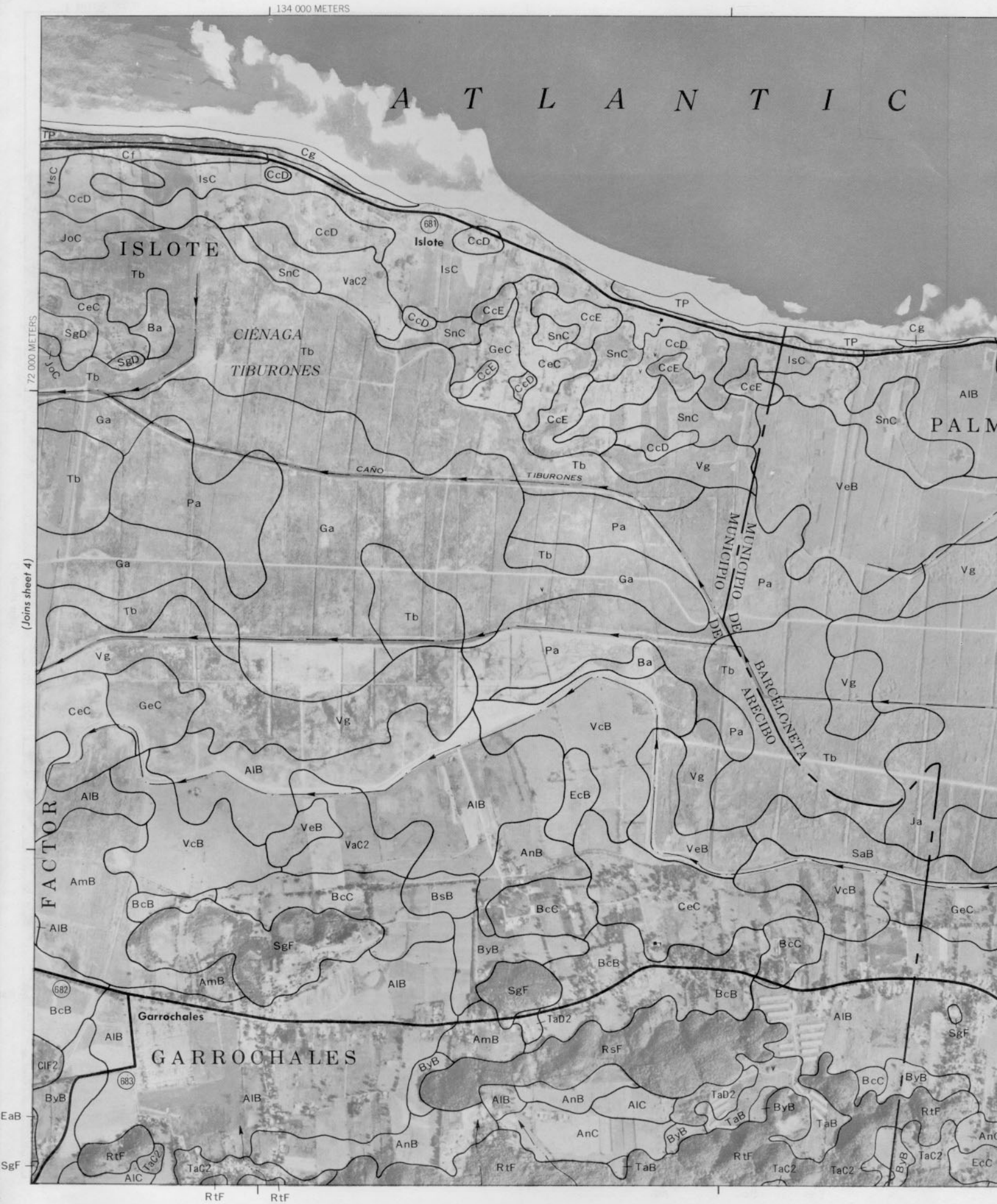
PUERTO RICO — SHEET NUMBER 2


118 000 METERS
72 000 METERS
ATLANTIC
(Joins sheet 2)
TP
SgF
CeC
Ps
SgD
RIC
Ur
Radioville
CID2
JoC
AgC
JoC
EaB
CeC
AgC
Barranca
ArC
GeC
653
w
EaB
SgD
SgF
AIC
AIB
SgD
CeC
SgD
SgD
GeC
SgD
CeC
ArC
SgD
SgD
SgF
EbB
SgD
SgF
SgF
GeC
GeC
CeC
CEMENTERIO MUNICIPAL
ArC
492
AgC
129
CeC
SgD
Ur
HATO
Obrero
AVENIDA
JOSE DE DIEGO
Oceanview
Colegio Regional de Arecibo
Joya de los Santos
MIRAMAR
129
Ur
SAN LUIS
ARECIBO
Santiago
CONSTITUCION
AVE
2
El Coto
Ba
Cn
AIC
EcC
SgF
RIC
Parque Atlético
Río
ABAJO
SgF
SgD
651
AIB
RIC
CIE2
SgF
RIC
RsF
RtF
Cn


OCEAN
Punta Morrillos
Tres Hermanos
Roca Cocinera
Roca Resuello
Puerto de Arecibo
San Luis
Monserrate
LA CRUZ
SAN FELIPE
JAREALES
VIGÍA
Jarealito
BUENOS AIRES
Santiago
CONSTITUCIONAL
LUIS LLORENS TORRES
AVE
RIO GRANDE DE ARECIBO
Santa Bárbara
Monte Grande
CAMBALACHE
Central Combalache
Las Mercedes
Parque Atlético
Rr
Cg
TP
Cf
HS
IsC
CcE
CcD
Ja
Ba
Pt
Cn
Ur
To
Vm
HD
VeB
w
681
(Joins sheet 4)
(Joins sheet 11)
124 000 METERS
70 000 METERS
1 Mile
5000 Feet
N
3

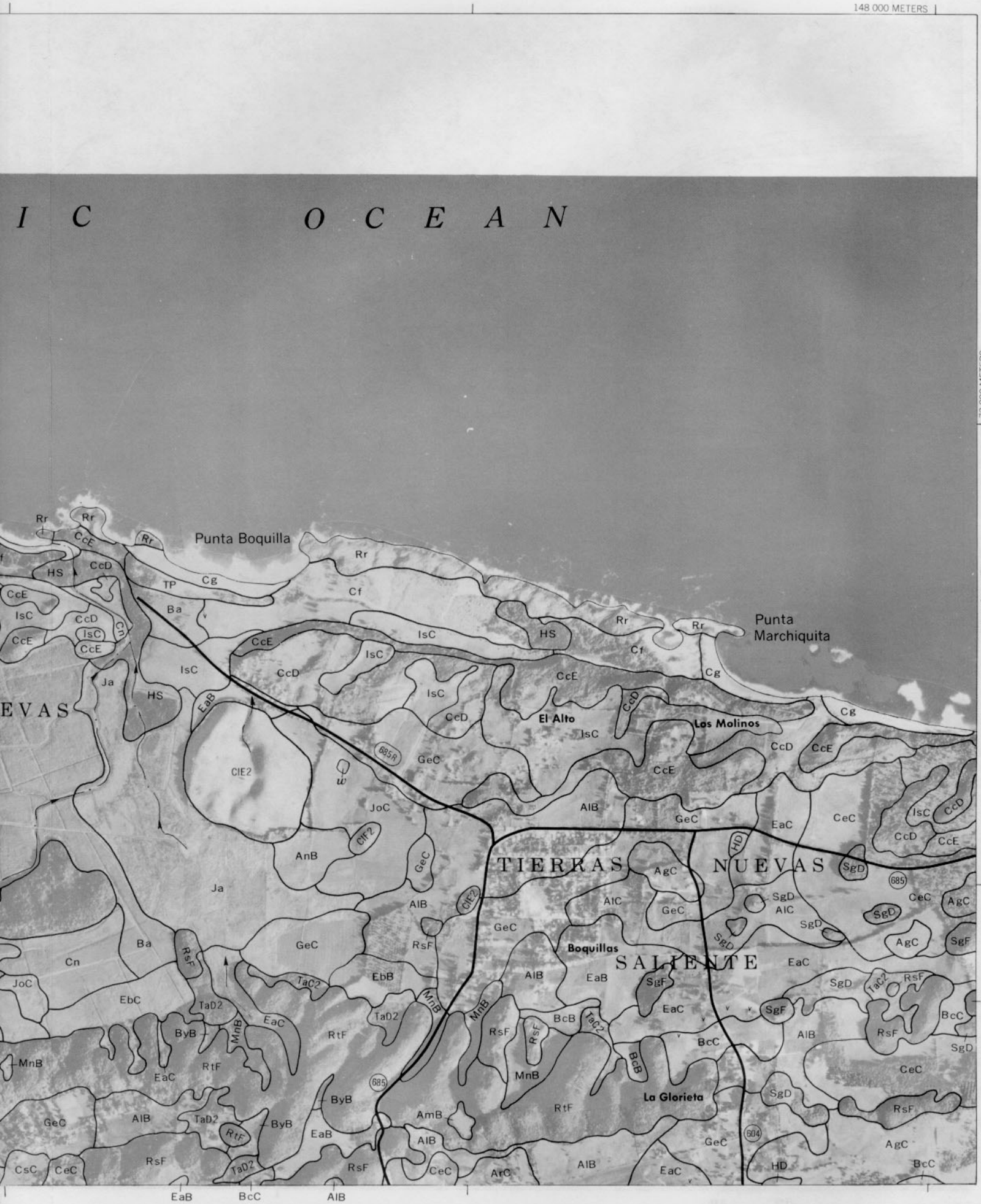

4
N
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
1/4
1/2
3/4
1
ATLANTIC OCEAN
Punta Caracoles
Rr
Cg
Cf
HS
IsC
TP
CcD
SnC
HD
VeB
Desvío Valdés
CID2
CIE2
JoC
Ja
Tb
Pa
Ba
Ga
Vg
GeC
Rincón
CIÉNAGA TIBURONES
CAÑO TIBURONES
CAMBALACHE
SANTANA
CAÑO VIEQUES
AEROPUERTO DE ARECIBO
Cn
VcB
VaB
AlB
SgD
SgF
AnB
BcB
BcC
CIF2
681
682
I
70 000 METERS
126 000 METERS
(Joins sheet 3)
(Joins sheet 12)

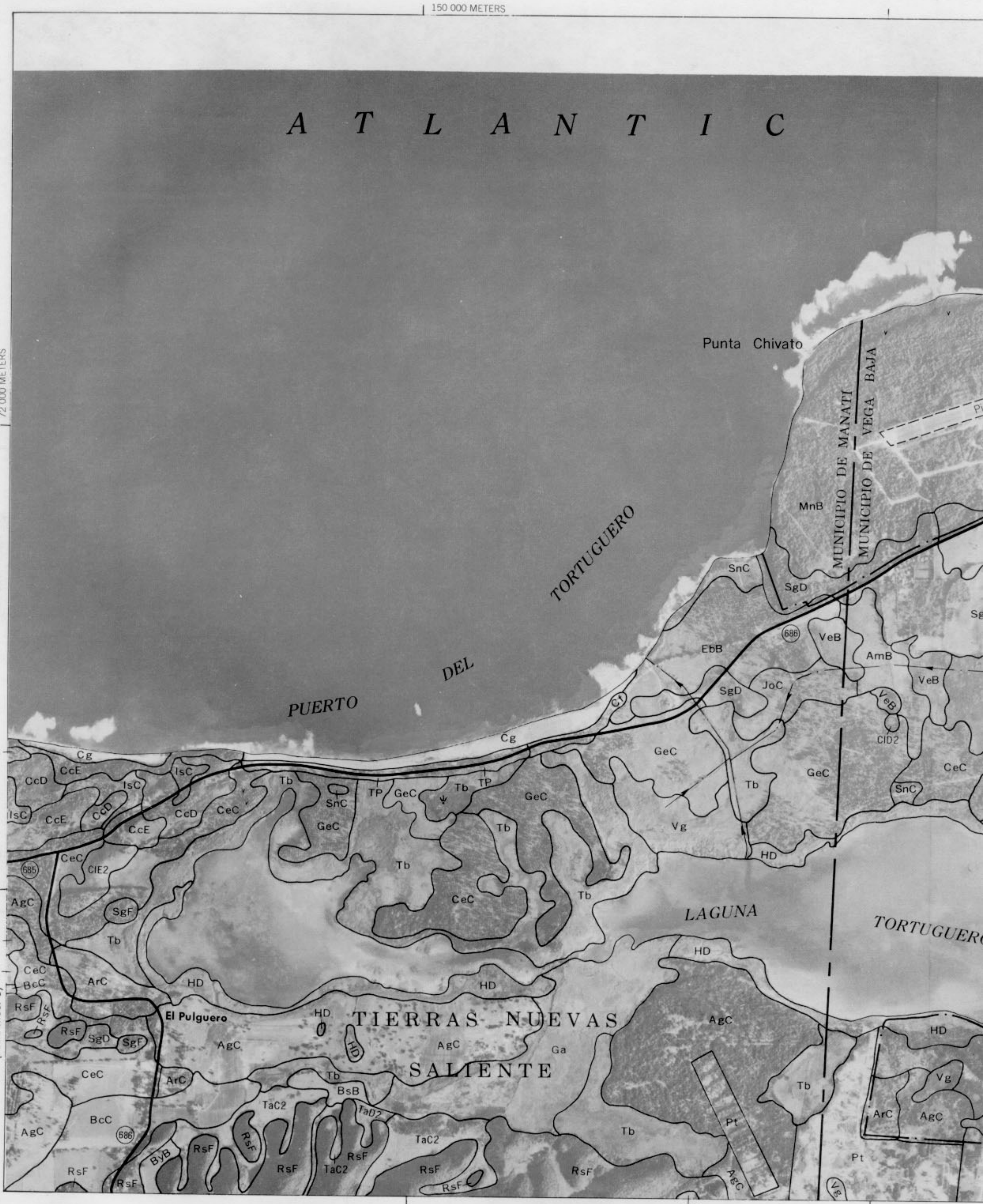

132 000 METERS
72 000 METERS
Punta
Las Tunas
Charca
La Tembladera
ISLOTE
FACTOR
Garrochales
Cercadillo
Rincón
Grande
CAÑO
TRIBURONES
(Joins sheet 5)
Rr
Cg
Cf
TP
IsC
CcD
CcE
Vg
SnC
SaB
GeC
CeC
SgD
JoC
Tb
CID2
VeB
Ga
SgF
Ps
AgC
CsC
Pt
Pa
AmB
AlB
EcB
BcC
ByB
BcB
CmF2
CIF2
CIE2
AnB
EaB
TaC2
AIC
Ba
Ba
682
681


134 000 METERS
72 000 METERS
ATLANTIC
ISLOTE
CIÉNAGA
TIBURONES
CAÑO
TIBURONES
Islote
MUNICIPIO DE BARCELONETA
MUNICIPIO DE ARECIBO
GARROCHALES
Garrochales
FACTOR
PALM
(Joins sheet 4)
TP
Cf
Cg
IsC
CcD
JoC
CeC
SgD
Ba
Tb
SnC
VaC2
CcE
GeC
Ga
Pa
Vg
VeB
AlB
VcB
EcB
AnB
BsB
BcC
BcB
AmB
SgF
ByB
TaD2
RsF
AlC
AnC
TaB
RtF
TaC2
ClF2
EaB
SaB
Ja
682
683
681

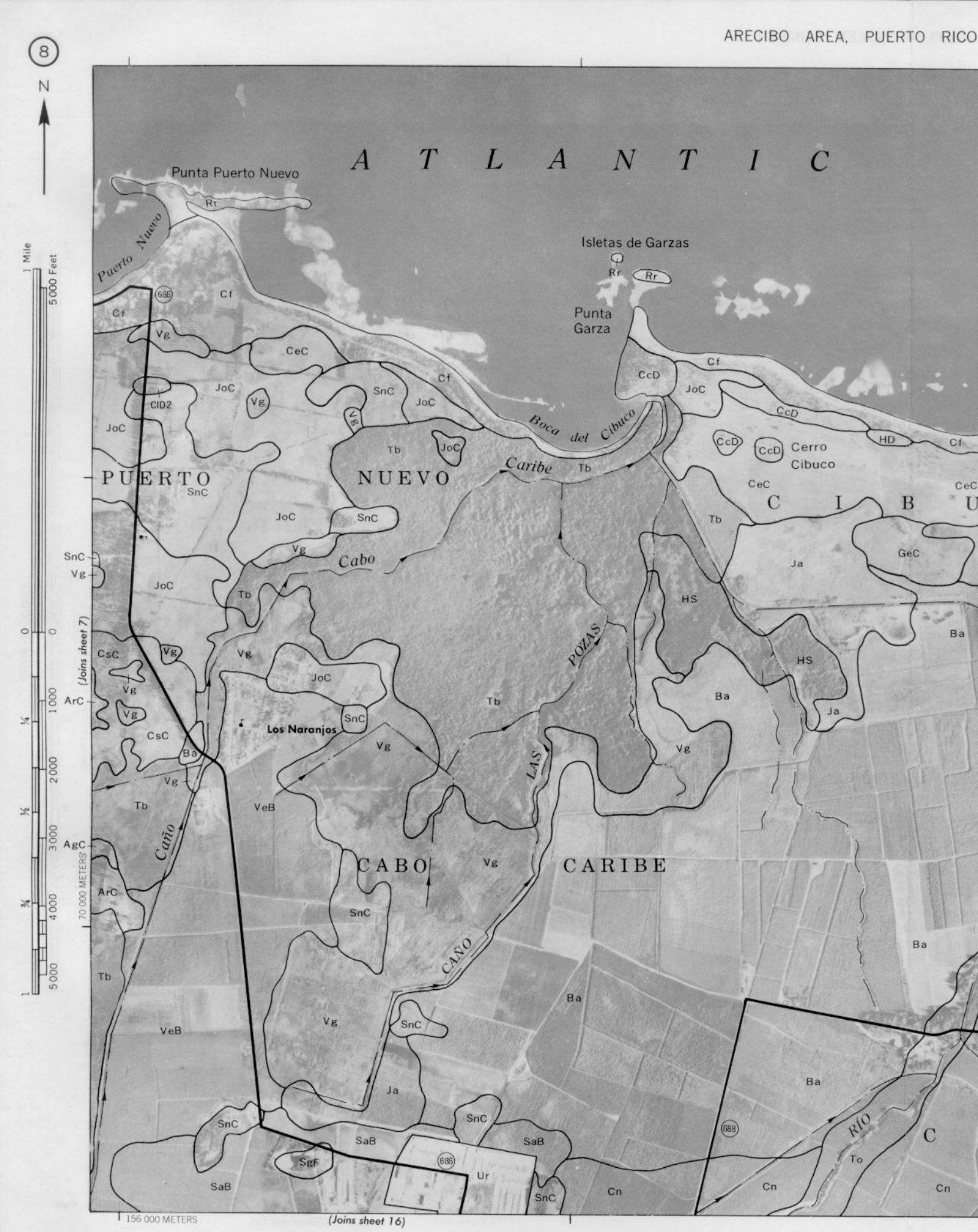

C O C E A N
Punta
Palmas Altas
PALMAS ALTAS
Palmas
Altas
GARROCHALES
MATOS
CAÑO
Rr
Cg
Cf
Tb
Ba
VeB
IsC
CcD
CcE
SnC
AlB
Ja
Vg
Pa
GeC
VaB
EcB
RsF
Ps
Cn
To
AnB
BsB
AnC
EcC
ByB
RtF
TaC2
TaQ2
SgF
ClF2
684
681
682
TP
AIC
(Joins sheet 6)
(Joins sheet 13)
1 Mile
5000 Feet
70 000 METERS
140 000 METERS
N

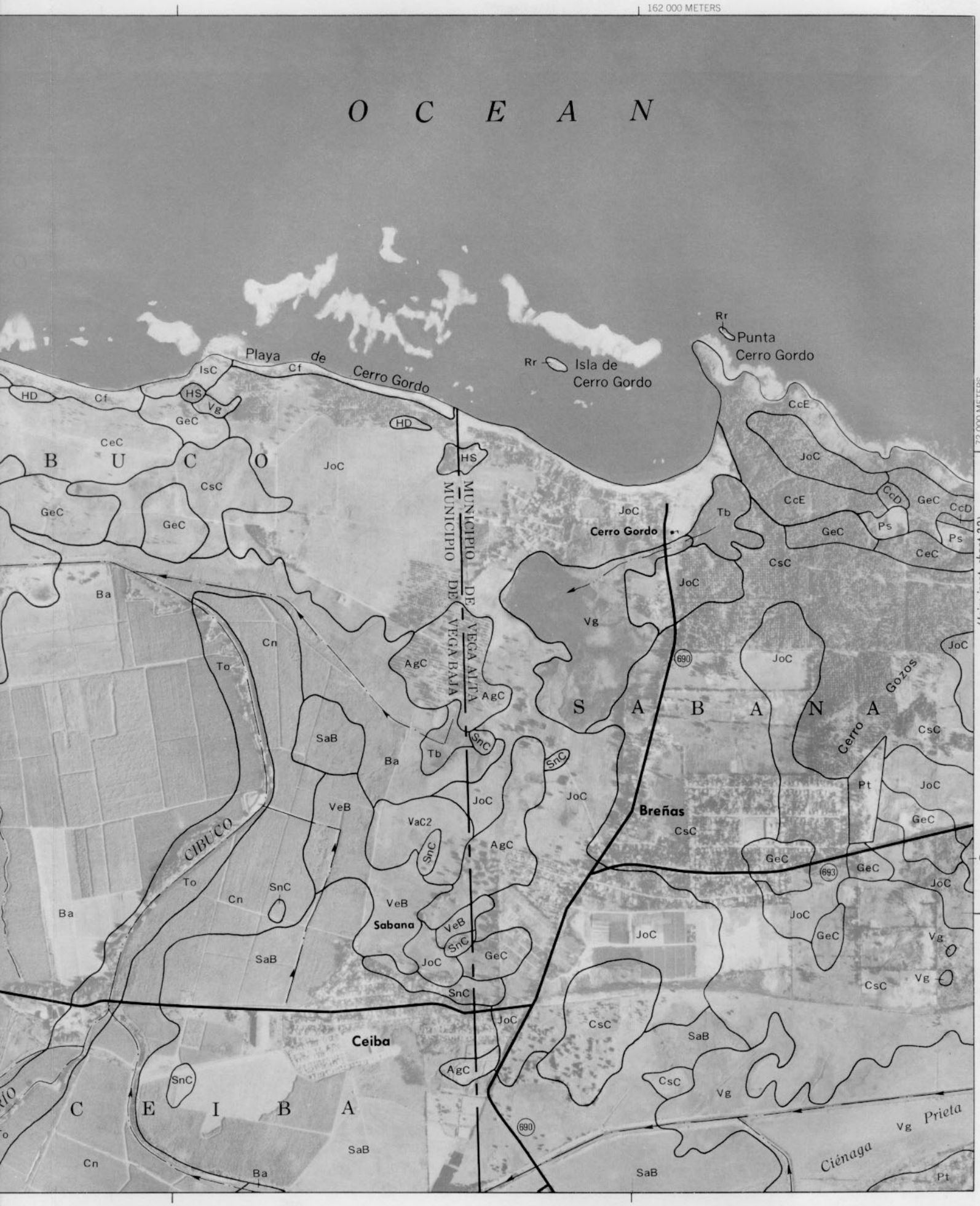
ARECIBO AREA, PUERTO RICO


148 000 METERS
72 000 METERS
I C O C E A N
Punta Boquilla
Punta Marchiquita
El Alto
Los Molinos
TIERRAS NUEVAS
SALIENTE
Boquillas
La Glorieta
EVAS
(Joins sheet 7)
Rr
CcE
CcD
HS
TP
Cg
Cf
Ba
IsC
Ja
EaB
CIE2
685A
GeC
JoC
AnB
ClF2
AlB
AgC
AlC
SgD
SgF
EaC
CeC
HD
Cn
RsF
TaC2
EbB
EbC
TaD2
ByB
MnB
RtF
BcB
BcC
AmB
ArC
CsC
685
604


150 000 METERS
72 000 METERS
A T L A N T I C
Punta Chivato
MUNICIPIO DE MANATI
MUNICIPIO DE VEGA BAJA
PUERTO DEL TORTUGUERO
LAGUNA TORTUGUERO
TIERRAS NUEVAS SALIENTE
El Pulguero
(Joins sheet 6)
IsC
SgF
EaC
AgC
Cg
CcE
CcD
IsC
CeC
Tb
SnC
GeC
TP
HD
EbB
SgD
JoC
VeB
AmB
ClD2
MnB
Vg
ClE2
ArC
BcC
RsF
SgD
BsB
TaC2
TaD2
ByB
Ga
Pt
686
685


7
N
OCEAN
Puerto Nuevo
Cf
686
NATIONAL GUARD RESERVATION
Sandín
Laguna de Puerto Nuevo
Pista de Aterrizaje
MUNICIPIO DE VEGA BAJA
PUERTO NUEVO
YEGUADO
TORTUGUERO
Cerro Guarico
Campo Tortuguero
NATIONAL GUARD RESERVATION
ALGARROBO
Laguna Rica
water
687
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1
70 000 METERS
154 000 METERS
(Joins sheet 8)
(Joins sheet 15)
MnB
EaB
BcC
TaB
EcB
AmB
VeB
CID2
SnC
SgD
SgF
GeC
EaC
AlC
CeC
JoC
AgC
ArC
CsC
HD
Pt
Vg
Tb
CIE2

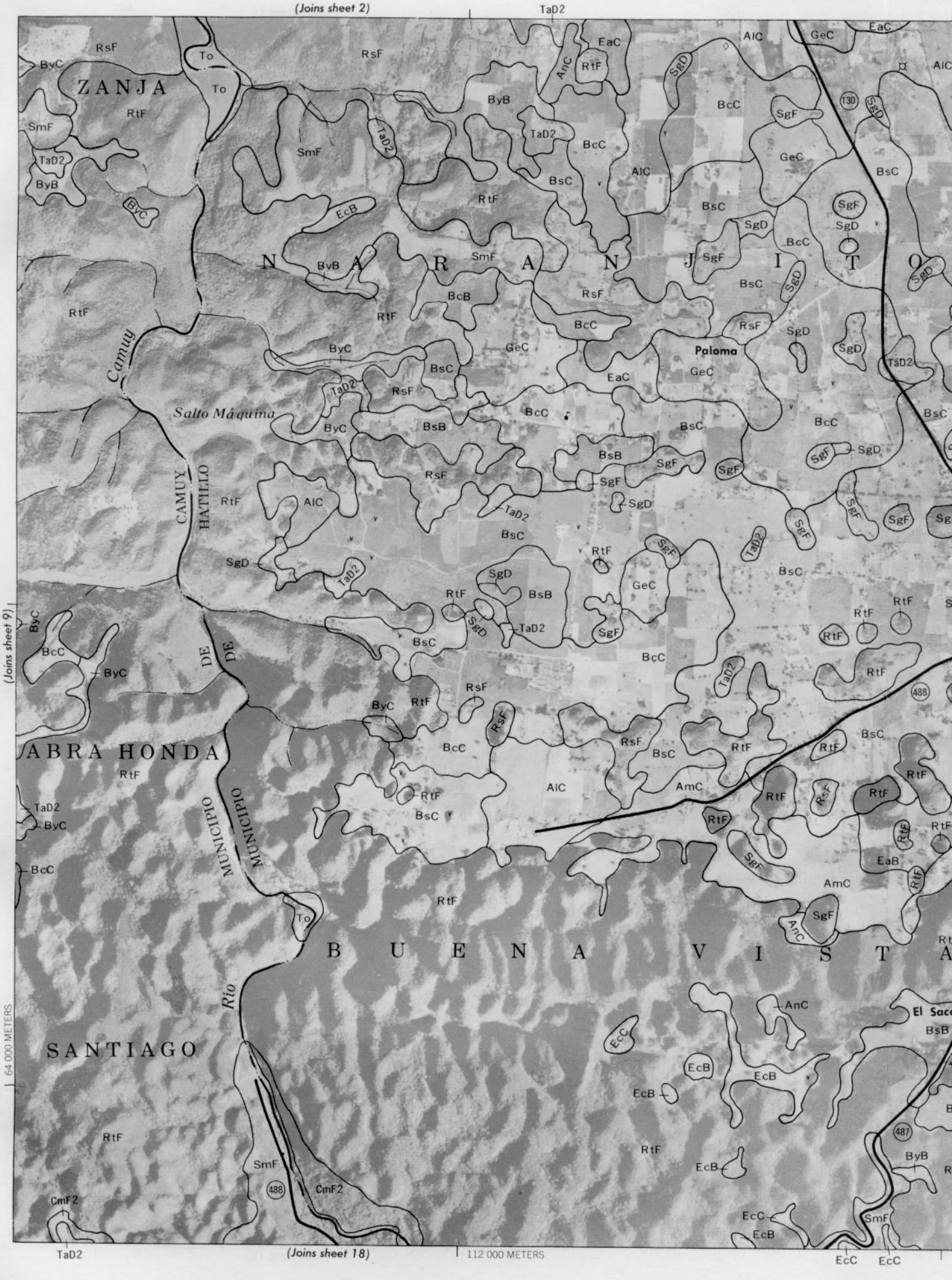

8
N
1 Mile
5000 Feet
0
0
1/4
1000
1/2
2000
3/4
3000
1
4000
5000
70 000 METERS
156 000 METERS
A T L A N T I C
Punta Puerto Nuevo
Puerto Nuevo
Isletas de Garzas
Punta Garza
Boca del Cibuco
Caribe
PUERTO NUEVO
CABO CARIBE
Cerro Cibuco
Cabo
POZAS
LAS
CAÑO
CAÑO
RÍO
Los Naranjos
(Joins sheet 7)
(Joins sheet 16)
686
688
Rr
Cf
Vg
CeC
JoC
SnC
CcD
CID2
Tb
HD
Ja
GeC
HS
Ba
CsC
ArC
AgC
VeB
SgF
Ur
SaB
Cn
To


162 000 METERS
72 000 METERS
(Joins inset, sheet 32)
O C E A N
Rr
Punta
Cerro Gordo
Rr
Isla de
Cerro Gordo
Playa de Cerro Gordo
Cf
IsC
HD
HS
Vg
GeC
CeC
B U C O
JoC
CsC
GeC
GeC
HD
HS
MUNICIPIO DE VEGA ALTA
MUNICIPIO DE VEGA BAJA
JoC
Cerro Gordo
Tb
CcE
JoC
CcD
GeC
CcD
Ps
GeC
Ps
CeC
CsC
JoC
Vg
Ba
Cn
To
AgC
AgC
SaB
Ba
Tb
SnC
SnC
JoC
JoC
VeB
VaC2
SnC
AgC
CIBUCO
To
Cn
SnC
Ba
VeB
Sabana
VeB
SnC
GeC
SaB
JoC
SnC
JoC
Ceiba
AgC
SnC
C E I B A
Cn
Ba
SaB
690
S A B A N A
Cerro Gozos
JoC
JoC
CsC
Pt
JoC
Breñas
CsC
GeC
GeC
693
GeC
JoC
JoC
GeC
Vg
CsC
Vg
CsC
SaB
CsC
Vg
Vg
Prieta
Ciénaga
SaB
Pt
CsC

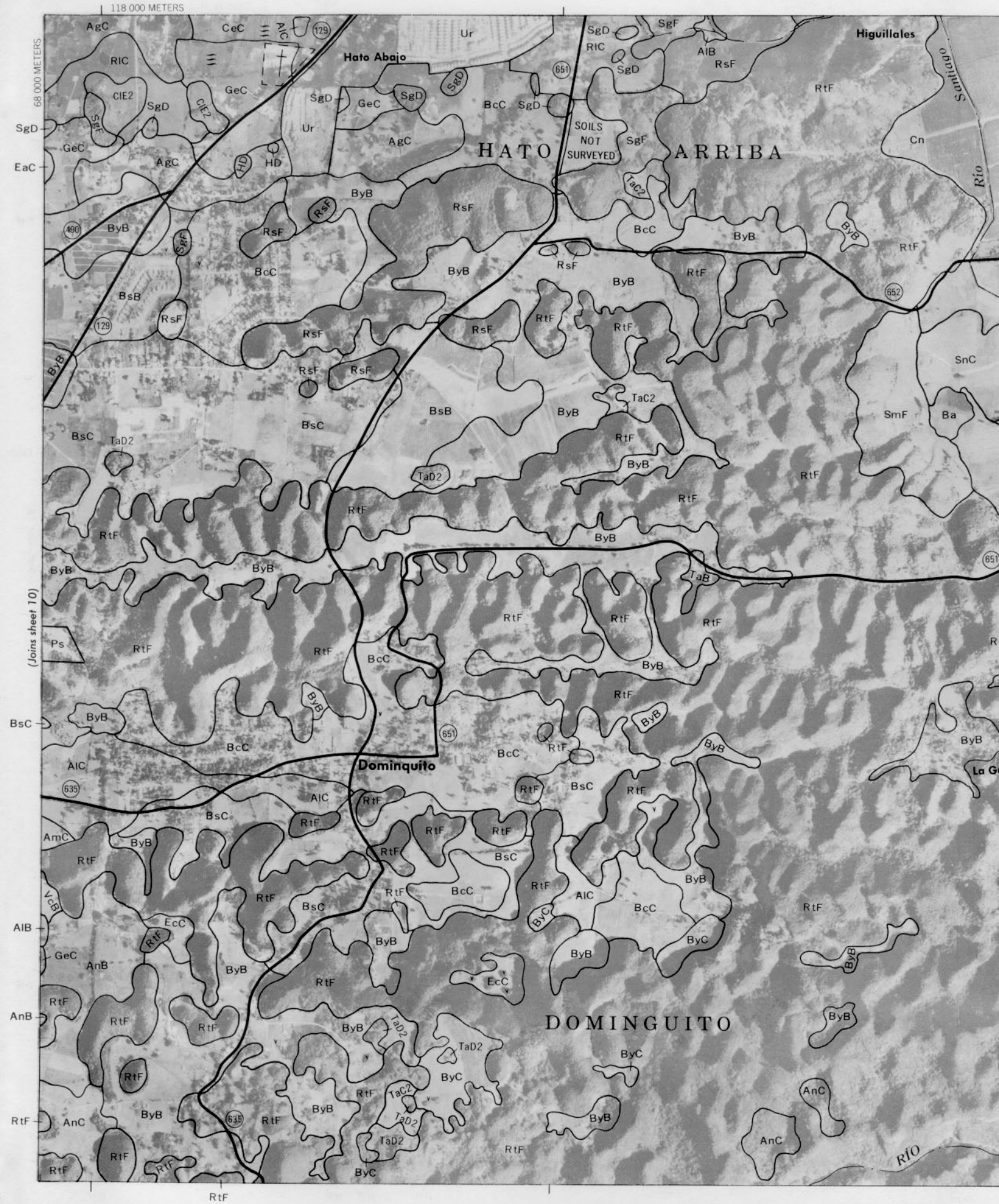

104 000 METERS
68 000 METERS
LIMIT OF SOIL SURVEY
CAMUY ARRIBA
Punta Brava
CIÉNAGAS
QUEBRADILLAS
CAMUY
DE
MUNICIPIO
PIEDRA GORDA
MONTAÑAS
GUARIONEX
AcC
RtF
SgD
BsC
CtB
RtF
TaD2
AcC
AnC
SgF
BsC
RtF
ByB
ByC
RtF
RtF
Ro
AcC
TaD2
BsC
SgD
RtF
Ro
BsC
SgD
SgD
RtF
AcC
ByC
TaD2
RtF
BcC
SgD
Ro
TaD2
RtF
AlC
BsC
RtF
BsC
BcC
RtF
BcB
AlC
GeC
VaC2
SgD
VaC2
RtF
AnC
RtF
ByC
AnC
RtF
AnB
Ro
EaC
CtC
RtF
RtF
AcC
AnC
ByC
AnC
ByC
Ro
AnC
TaD2
AnC
Ro
EcC
RtF
CtC
EcC
Ro
AmC
TaD2
TaD2
BsC
RtF
RtF
SgD
RtF
EbC
BsC
RtF
BcC
SgD
RtF
RtF
TaD2
BsC
SgF
SgD
EbC
RtF
BsC
RtF
AnC
ByC
EcC
TaD2
VaC2
RtF
RtF
RtF
TaD2
ByC
AmC
EcC
RtF
TaD2
ByC
RtF
RtF
TaD2
ByC
SgD
SgD
SgD
BsC
RtF
RtF
EcC
ByC
ByC
SgD
SgF
RtF
TaD2
ByC
RtF
AlC
EcC
RtF
EcB
RtF
AnC
ByC
BsC
RtF
TaD2
RtF
ByC
SmF
TaD2
BcC
ByC
RtF
GeC
ByB
RtF
RtF
SmF
SmF
EcC
SmF
RtF
RtF


9
N
(Joins sheet 1)
(Joins sheet 10)
(Joins sheet 17)
Alianza
Matojillo
ZANJA
ABRA HONDA
SANTIAGO
ÉNAGAS
1 Mile
5000 Feet
64 000 METERS
110 000 METERS
0
1000
2000
3000
4000
5000
¼
½
¾
1

ARECIBO AREA, PUERTO RIC

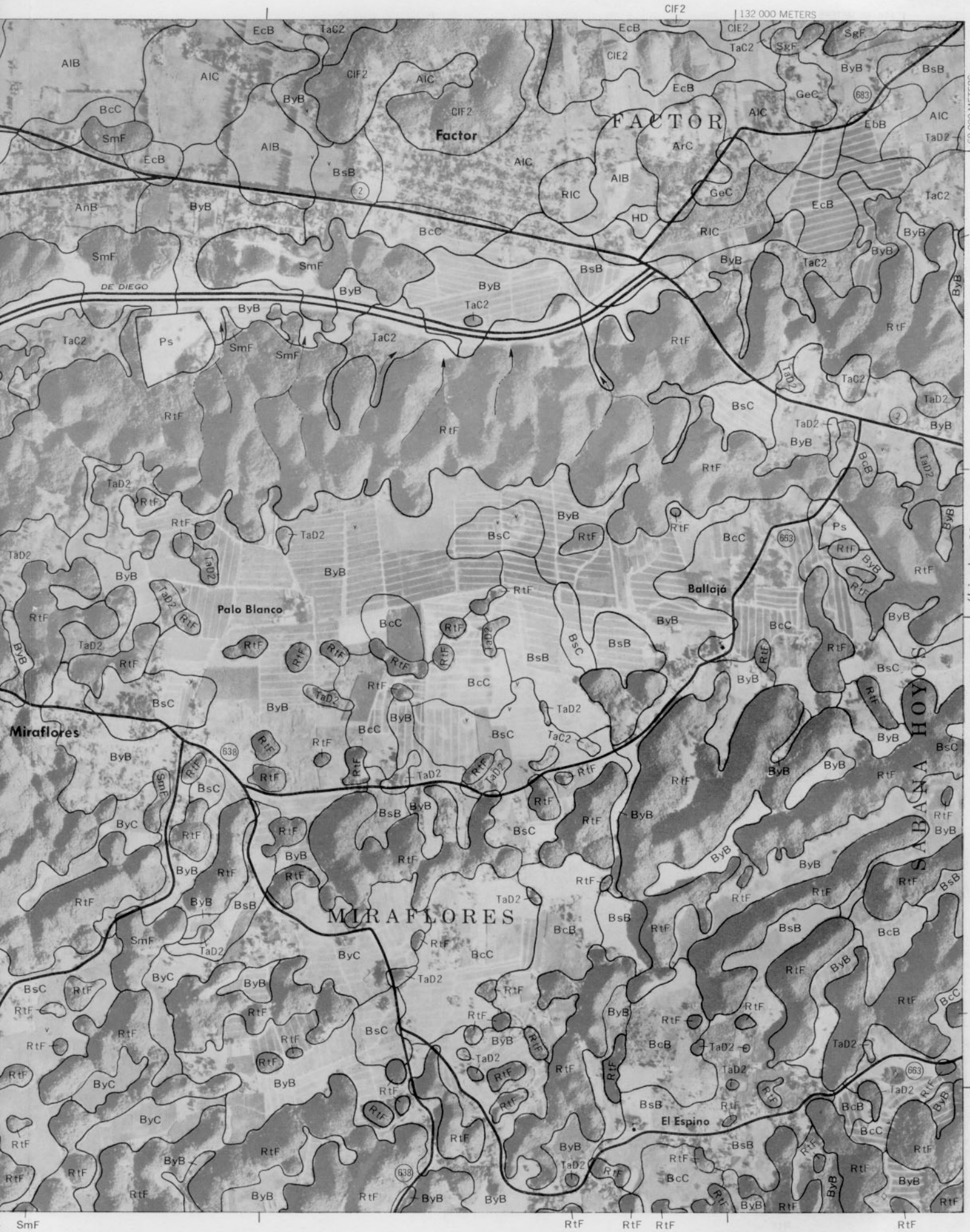



116 000 METERS
68 000 METERS
HATO ABAJO
C O R C O V A D O
HATO ARRIBA
CAMPO ALEGRE
DOMINGUITO
HATILLO DE ARECIBO
MUNICIPIO
Cuatro Calles
El Pajuil
El Saco
Rafael Capó
(Joins sheet 11)

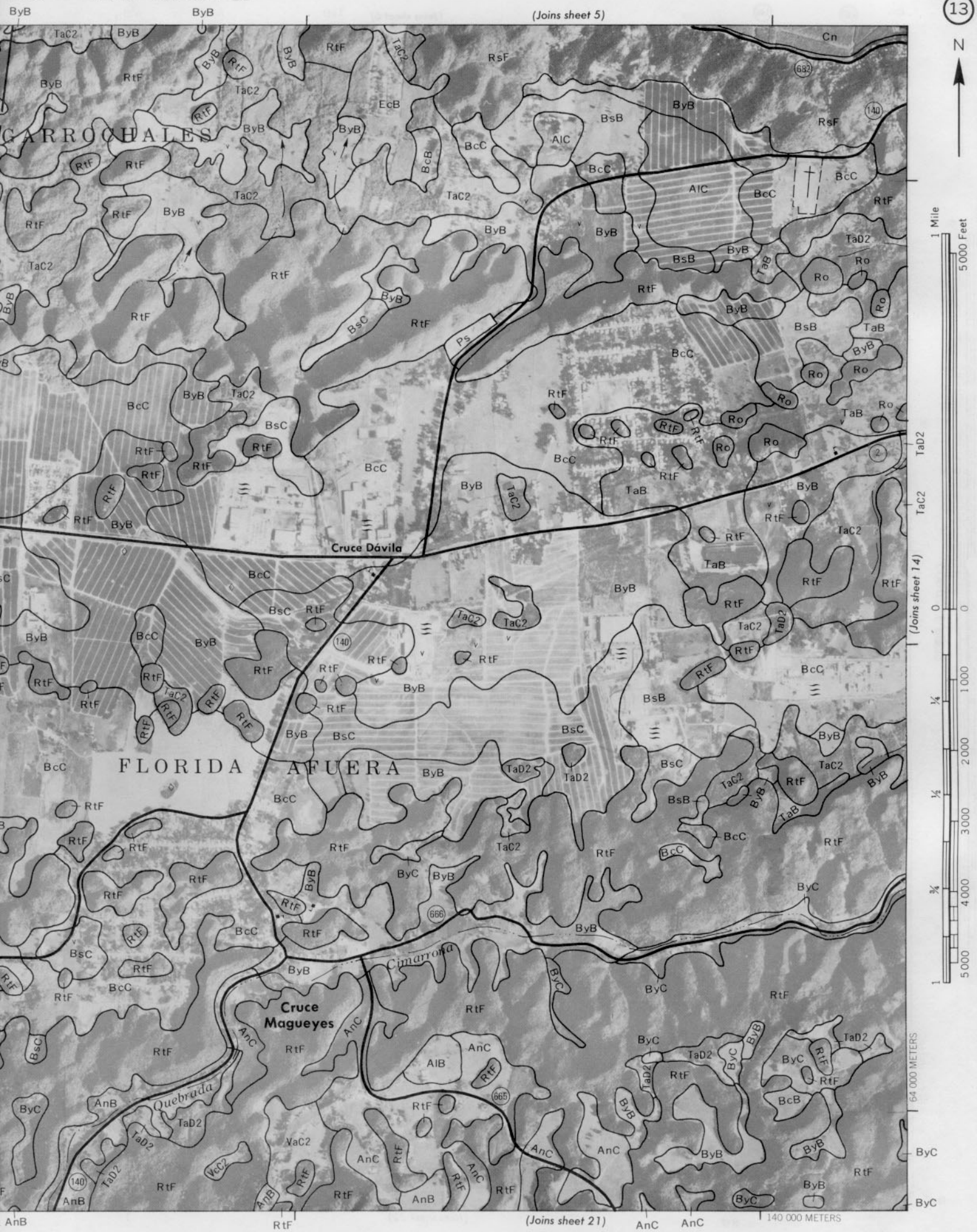

118 000 METERS
68 000 METERS
HATO ARRIBA
SOILS NOT SURVEYED
Hato Abajo
Higuillales
Dominquito
DOMINGUITO
Río
Río
Santiago
(Joins sheet 10)
AgC
CeC
AlC
RIC
Ur
SgD
SgF
AlB
RsF
RtF
GeC
CIE2
SgE
EaC
HD
ByB
BcC
BsB
BsC
TaD2
TaC2
SnC
SmF
Ba
Cn
Ps
AmC
VcB
EcC
AnB
AnC
ByC
TaB
490
129
635
651
652


(Joins sheet 3)
Santiago
Río
San Francisco
Oriente
TANAMA
Central Los Caños
La Guinea
El Dique
Charco Hondo
RÍO TANAMÁ
RÍO GRANDE DE ARECIBO
EXPRESO DE DIEGO
DOMINGO RUÍZ
Las Claras
HATO VIEJO
San Pedro
Cn
To
Vm
Re
SmF
VeB
AnB
Ps
VcB
SnC
Ba
ByB
RtF
SoC
SoD
CmF2
CtF2
(Joins sheet 19)
(Joins sheet 12)
1 Mile
5000 Feet
64 000 METERS
124 000 METERS
N


N
1 Mile
5000 Feet
(Joins sheet 4)
(Joins sheet 11)
(Joins sheet 20)
64 000 METERS
126 000 METERS
AEROPUERTO DE ARECIBO
SANTANA
Santana
DOMINGO RUÍZ
Domingo Ruíz
Quebrada
EXPRESO
Buena Vista
Bajadero
ARENALEJOS
Río Grande de Arecibo
Regadera
Miraflores
Biafara
VeB
Cn
AnB
CIE2
BcC
ByB
EaB
AlB
BcB
RIC
Ps
VcB
BsB
EcB
TaC2
SmF
TaD2
RtF
AlC
AnC
AmC
BcC
To
Vm
Re
AmB
ByC
BsC
GeC
NaD
AgC
682
662
638
657
656
637
22
2


132 000 METERS
68 000 METERS
FACTOR
Factor
DE DIEGO
Palo Blanco
Ballajá
Miraflores
MIRAFLORES
SABANA HOYOS
El Espino
(Joins sheet 13)
AlB
AlC
ArC
AnB
BcC
BsB
BsC
ByB
ByC
CIF2
CIE2
EcB
EbB
GeC
HD
RIC
SgF
SmF
Ps
RtF
TaC2
TaD2
683
2
663
638

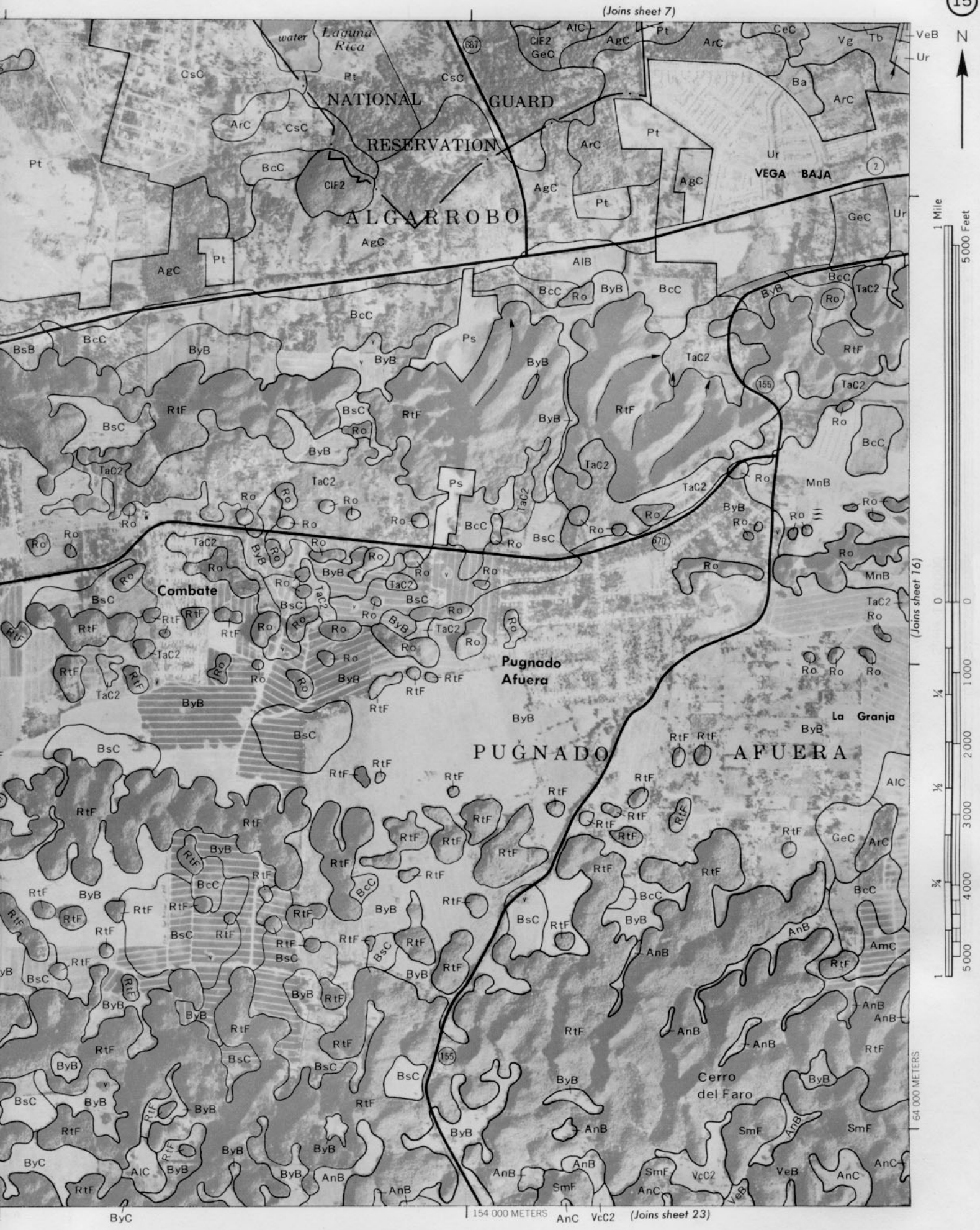

134 000 METERS
68 000 METERS
GARROCHALES
SABANA HOYOS
La Aldea
Sabana Hoyos
ARECIBO
BARCELONETA
MUNICIPIO
MUNICIPIO
DE
DE
(Joins sheet 12)
AIB
TaC2
AIC
ByB
BsB
RtF
TaD2
BcC
BcB
BsC
ArC
RIC
ByC
AnB
AnC
639
663
664
140
2


(Joins sheet 5)
GARROCHALES
Cruce Dávila
FLORIDA AFUERA
Cruce Magueyes
Cimarrona
Quebrada
(Joins sheet 14)
(Joins sheet 21)
N
1 Mile
5000 Feet
64 000 METERS
140 000 METERS

ARECIBO AREA, PUERTO RICO

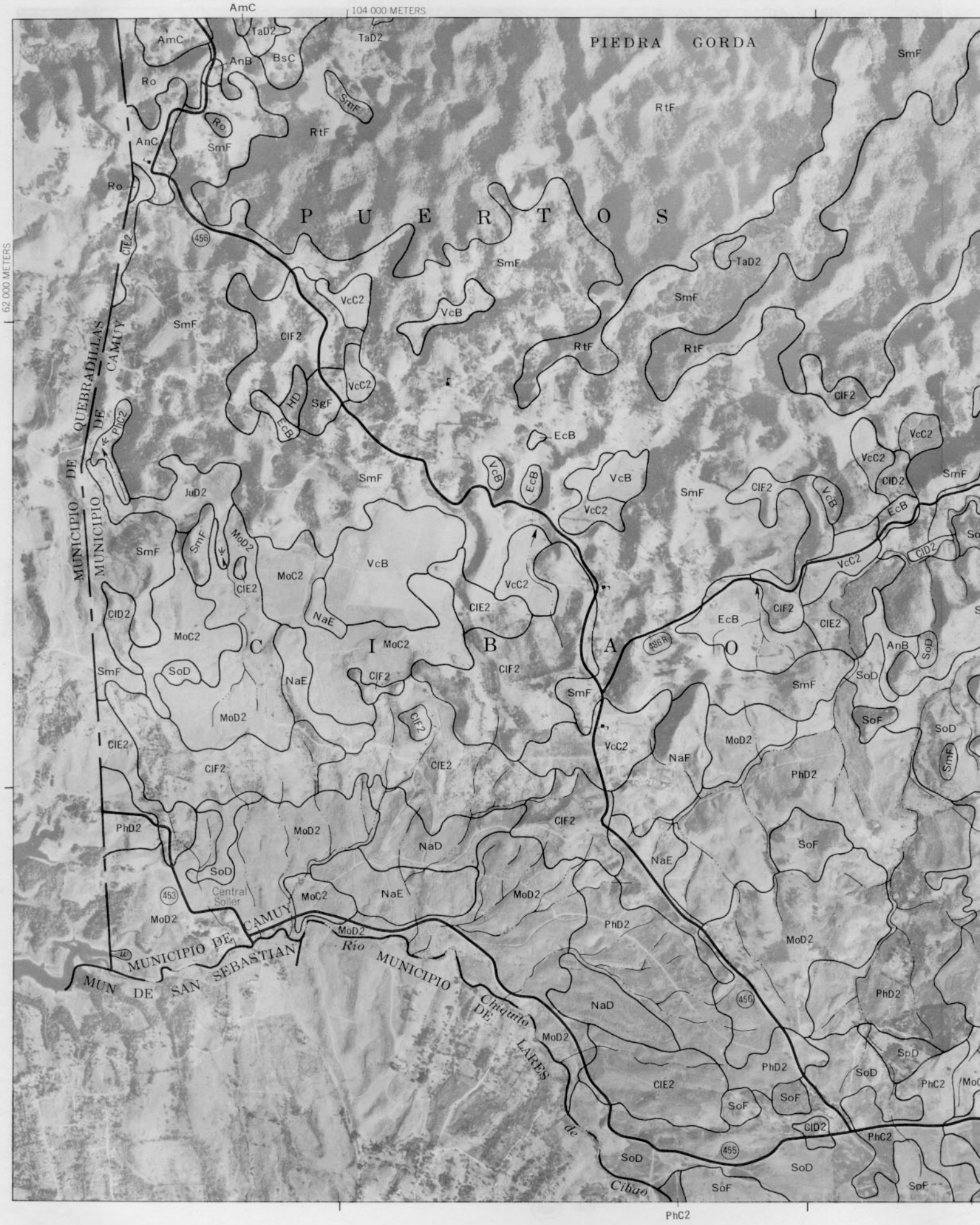

148 000 METERS
68 000 METERS
TIERRAS NUEVAS PONIENTE
AFUERA
El Cantito
San José
Altagracia
MANATÍ
Córdova Dávila
Sabana Seca
COTO SUR
DE MANATÍ
GRANDE
(Joins sheet 15)
BcC
HD
AgC
CeC
RsF
TaD2
EaB
RtF
TaC2
AlB
ArC
SgD
EaC
GeC
BcC
TaB
BcB
ByB
EbB
BsB
EcB
EaC
ArC
Ur
Ps
Cn
To
Ba
AnB
VeB
Vm
CmF2
BsC
149
670
604
685
2


150 000 METERS
68 000 METERS
(Joins sheet 14)
COTO NORTE
COTO SUR
Coto Norte
Campo Alegre
El Pueblito
Palo Alto
Coto Sur
Sabana Seca
MUNICIPIO DE MANATÍ
MUNICIPIO DE VEGA BAJA
686
670
672
ByB
RsF
TaC2
BcC
CeC
AgC
CsC
ArC
Pt
AlC
SgD
RtF
BsC
TaD2
EaB
GeC
Ps
Vg
BsB
EaC
Ur
Ro
AnB
AmC
ByC

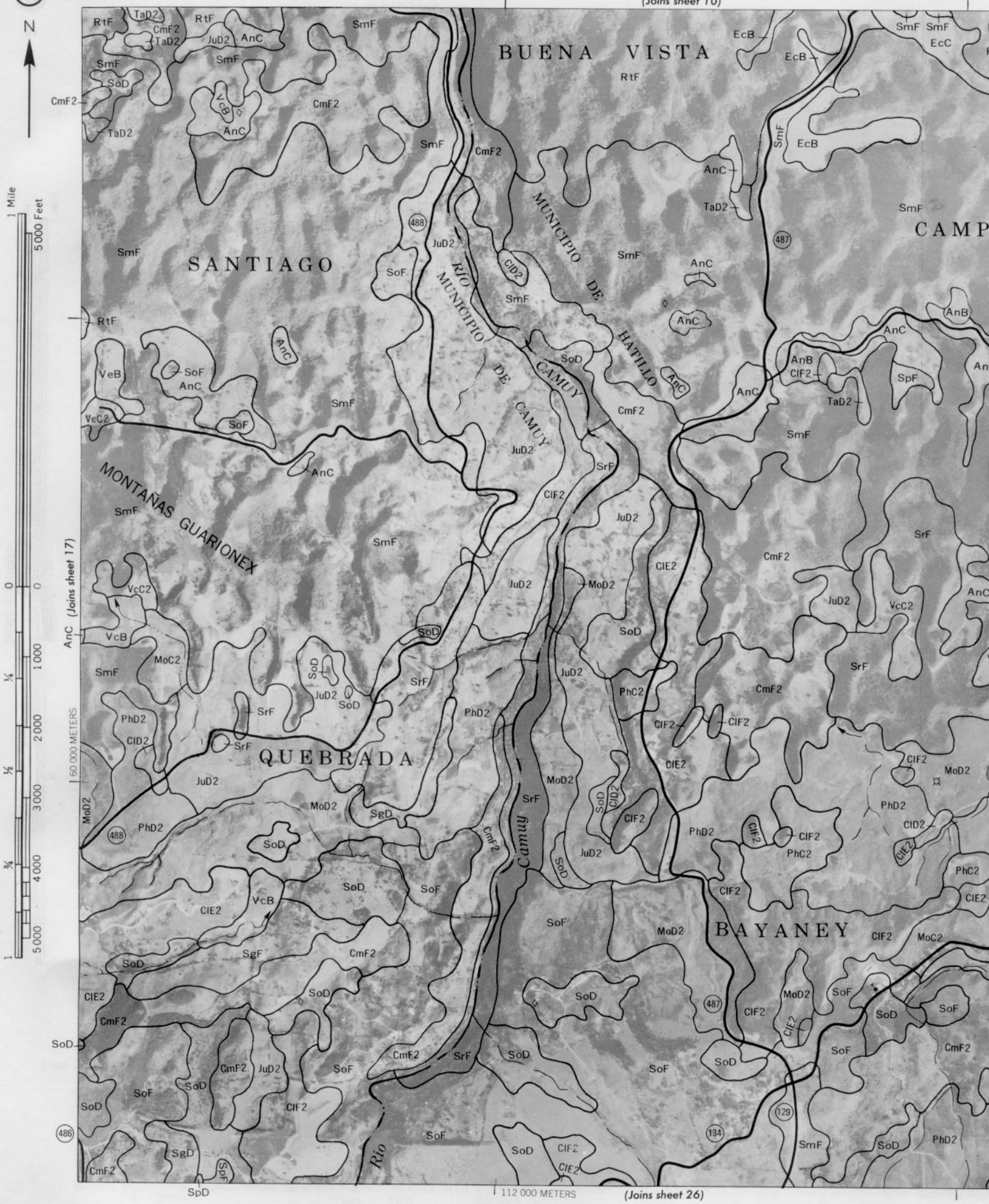

(Joins sheet 7)
water
Laguna Rica
NATIONAL GUARD RESERVATION
ALGARROBO
VEGA BAJA
Combate
Pugnado Afuera
PUGNADO AFUERA
La Granja
Cerro del Faro
(Joins sheet 16)
(Joins sheet 23)
154 000 METERS
64 000 METERS
1 Mile
5000 Feet
N


(Joins sheet 8)
CABO CARIBE
Ojo de Agua
Monte Carlo
VEGA BAJA
RÍO ABAJO
Río Indio
Planta de Purificación
VERTEDERO
Río Abajo
ALMIRANTE NORTE
Cerro Miraflores
RÍO ARRIBA
(Joins sheet 15)
(Joins sheet 24)
1 Mile
5000 Feet
64 000 METERS
156 000 METERS


162 000 METERS
68 000 METERS
CEIBA
SABANA
Ceiba
Monserrate
Regadera
MUNICIPIO DE VEGA BAJA
MUNICIPIO DE VEGA ALTA
CIBUCO
RIO
BAJURA
VEGA ALTA
VERTEDERO
NORTE
MIRANTE
(Joins inset, sheet 25)
Ba
SaB
Vg
Pt
GeC
VcB
AmC
ByB
AIC
RtF
MmF
TaD2
TaC2
ByC
SmF
To
Cn
AnC
AmB
AnB
EcB
PnC2
CIF2
Ur


104 000 METERS
62 000 METERS
PIEDRA GORDA
P U E R T O S
C I B A O
MUNICIPIO DE QUEBRADILLAS
MUNICIPIO DE CAMUY
MUNICIPIO DE CAMUY
MUN DE SAN SEBASTIAN
MUNICIPIO DE LARES
Central Soller
Rio Chiquito de Cibao
AmC
TaD2
AnB
BsC
Ro
SmF
RtF
AnC
VcC2
VcB
CIF2
HD
SgF
EcB
PhC2
JuD2
MoD2
MoC2
CIE2
CID2
NaE
SoD
NaD
PhD2
SoF
SpD
SpF
PhC2
456
455
453
486R


(Joins sheet 9)
S A N T I A G O
MONTAÑAS
GUARIONEX
Q U E B R A D A
(Joins sheet 18)
(Joins inset, sheet 45)
CmF2
CmF2
CmF2
110 000 METERS
60 000 METERS
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
1/4
1/2
3/4
1
N
17
ByC
SmF
RtF
TaD2
AnC
SoD
VcB
VcC2
EcC
JuD2
HD
SoF
Ba
SrF
VcB
ClD2
EcB
AnB
MoC2
PhD2
MoD2
NaE
NaD
SpD
SpF
PhC2
ClE2
SoC
455
486


N
(Joins sheet 10)
BUENA VISTA
SANTIAGO
MUNICIPIO DE CAMUY
RIO CAMUY
MUNICIPIO DE HATILLO
MONTAÑAS GUARIONEX
QUEBRADA
BAYANEY
CAMP
Camuy
Rio
(Joins sheet 17)
(Joins sheet 26)
1 Mile
5000 Feet
60 000 METERS
112 000 METERS
RtF
TaD2
CmF2
JuD2
AnC
SmF
SoD
VcB
EcB
EcC
AnB
SoF
CID2
VeB
VcC2
MoC2
SrF
PhD2
CIE2
CIF2
MoD2
SgD
SgF
SpF
SpD
PhC2
488
487
486
129
134


116 000 METERS
62 000 METERS
CAMPO ALEGRE
AIBONITO
Bayaney
ESPERANZA
DOMINGUITO
HATILLO
ARECIBO
MUNICIPIO DE
MUNICIPIO DE
(Joins sheet 19)
129
489
489R
134
635
625


118 000 METERS
62 000 METERS
(Joins sheet 18)
DOMINGUITO
ESPERANZA
La Esperanza
Río Tanamá
635
626
625
623


(Joins sheet 11)
San Pedro
TANAMÁ
Las Llanadas
HATO VIEJO
BOSQUE ESTATAL DE RÍO ABAJO
RÍO GRANDE DE ARECIBO
(Joins sheet 20)
(Joins sheet 27)
124 000 METERS
60 000 METERS
1 Mile
5000 Feet
N
19
ByB
ByC
RtF
SmF
EcB
EcC
AnB
AnC
SoD
Ps
ClF2
CmF2
AmC
VcB
Vm
Rm
Re
TaD2
TaC2
SrF
w
10
626
623
656

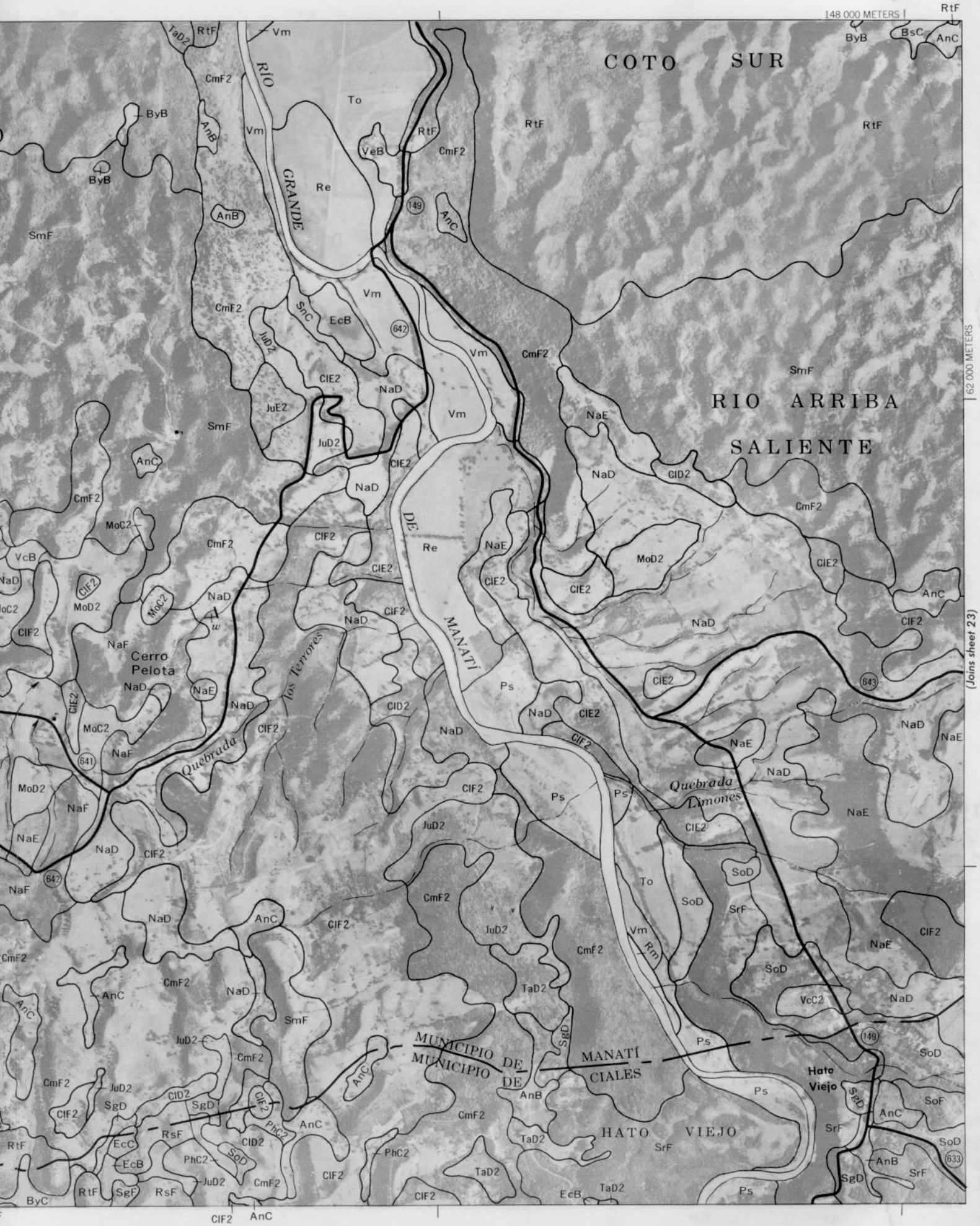

(Joins sheet 12)
(Joins sheet 19)
(Joins sheet 28)
20
N
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
60 000 METERS
126 000 METERS
RÍO GRANDE DE ARECIBO
Río Grande de Arecibo
HATO VIEJO
CARRERAS
CARRERAS
Los Cántaras
Los Muertos
AnB
AnC
BcC
BsC
ByB
ByC
CmF2
ClF2
EcB
EcC
HD
InD
PhC2
Ps
RtF
Re
Rm
SmF
SoD
SoF
SrF
TaD2
To
Vm
VcB
VcC2
637
656
10
627


132 000 METERS
62 000 METERS
R O Z A L
SABANA HOYOS
Varela
(638)
(627)
(628)
(Joins sheet 21)
BsC
RtF
ByC
ByB
BcC
EcB
AnC
AnB
SmF
EcC
CmF2
VcC2
PhC2
VcB
CIF2
CIE2
AlB
VaC2
Vg
w
NaE
SoF
CID2
HD
TaD2
SgD
SgF


134 000 METERS
62 000 METERS
(Joins sheet 20)
La Alianza
FLORIDA
SABANA HOYOS
Asomante
Loma Correa
Montaña
Hacienda San José
MUNICIPIO DE ARECIBO
MUNICIPIO DE BARCELONETA
Cimarrona
Quebrada
639
664
628
140


(Joins sheet 13)
AFUERA
FLORIDA ADENTRO
FLORIDA
Rafael Arroyo
(Joins sheet 22)
(Joins sheet 29)
60 000 METERS
140 000 METERS
1 Mile
5000 Feet
N
21

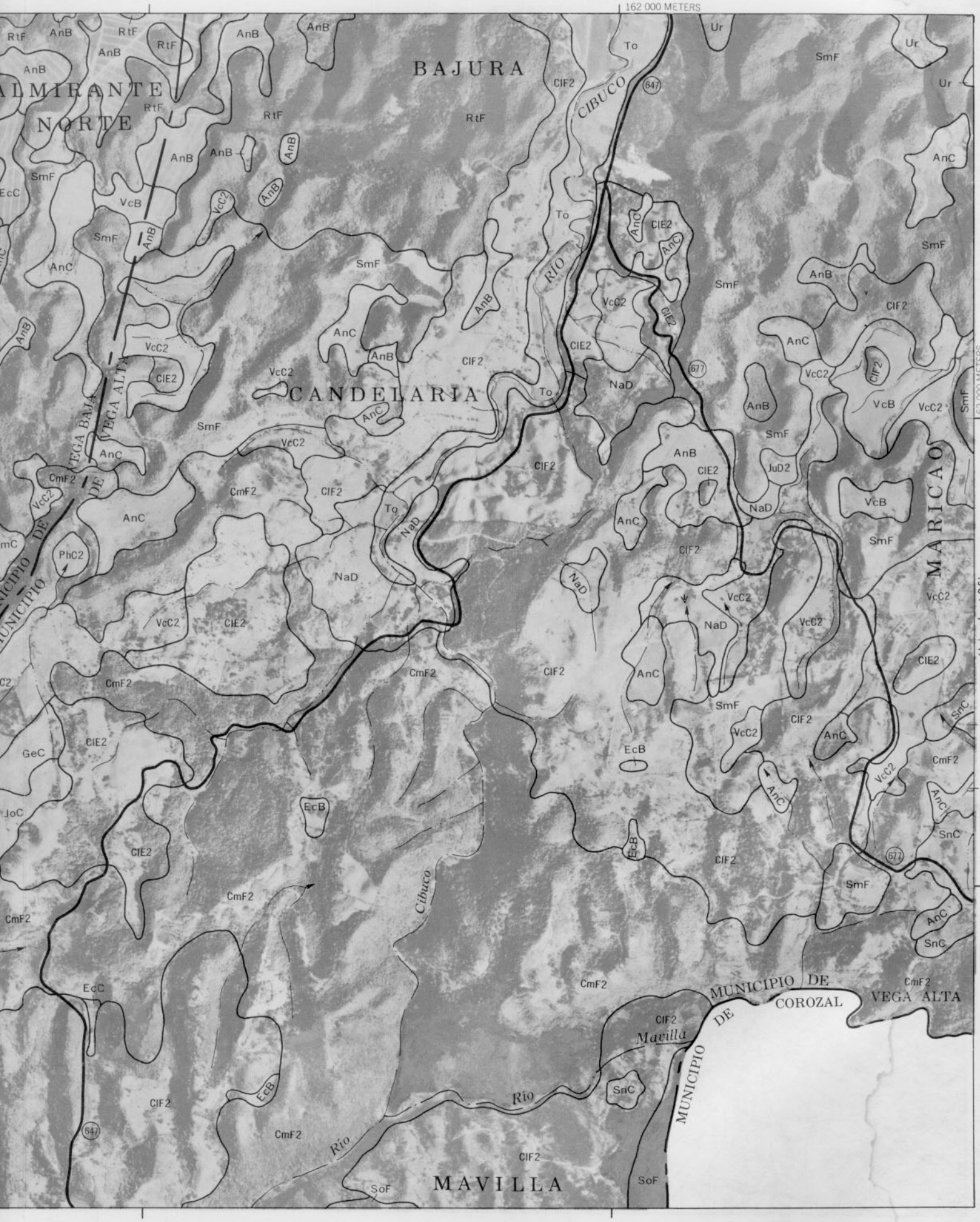

22
N
(Joins sheet 14)
BAJURA ADENTRO
FLORIDA AFUERA
FLORIDA ADENTRO
RIO ARRIBA PONIENTE
MUNICIPIO DE BARCELONETA
MANATI
Montebello
(Joins sheet 21)
(Joins sheet 30)
1 Mile
5000 Feet
60 000 METERS
142 000 METERS
667
641
642

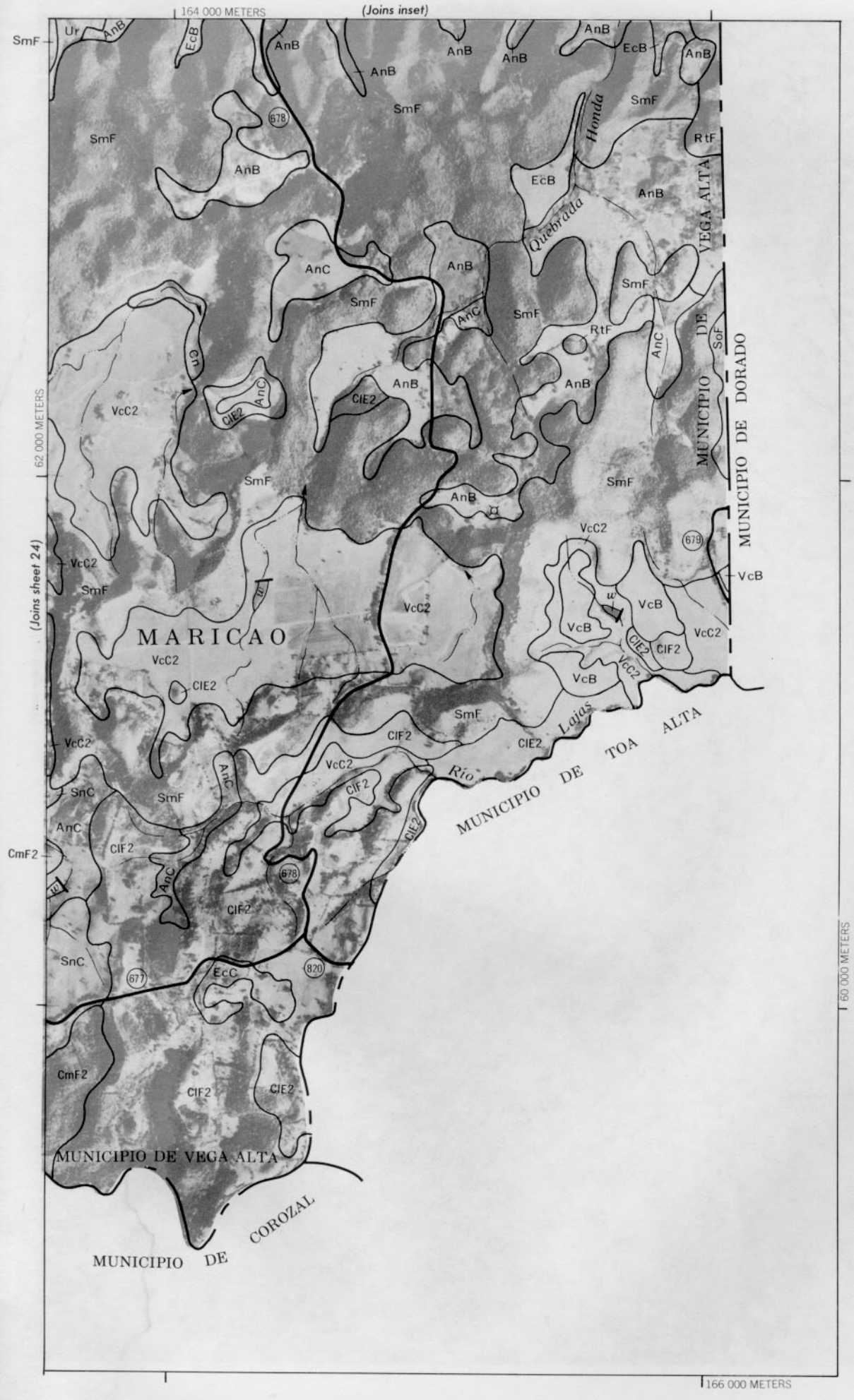

148 000 METERS
62 000 METERS
COTO SUR
RIO ARRIBA SALIENTE
RÍO GRANDE DE MANATÍ
Cerro Pelota
Quebrada los Terrores
Quebrada Limones
MUNICIPIO DE MANATÍ
MUNICIPIO DE CIALES
HATO VIEJO
Hato Viejo
(Joins sheet 23)
TaD2
RtF
Vm
CmF2
ByB
AnB
To
VeB
Re
149
AnC
SmF
SnC
EcB
642
JuD2
ClE2
NaD
JuE2
NaE
ClD2
MoC2
VcB
ClF2
MoD2
NaF
641
643
Ps
SoD
SrF
Rm
VcC2
SgD
PhC2
EcC
RsF
SoF
SgF
ByC
633

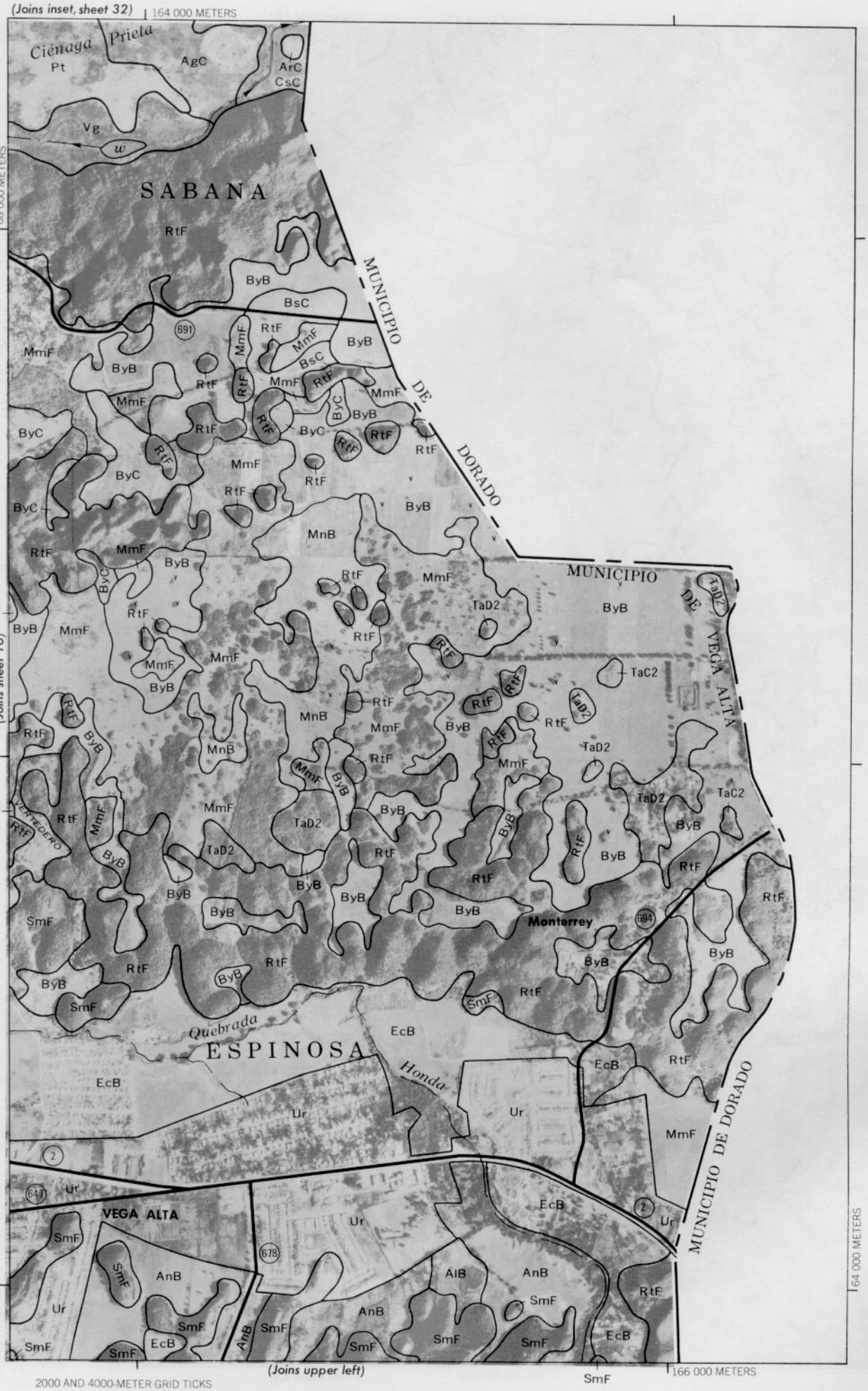

150 000 METERS
62 000 METERS
COTO SUR
PUGNADO
RÍO ARRIBA SALIENTE
El Salto
MUNICIPIO DE MANATI
MUNICIPIO DE VEGA BAJA
PUGNADO ADENTRO
BARAHONA
HATO VIEJO
MUNICIPIO DE MANATI
MUNICIPIO DE MOROVIS
MUNICIPIO DE CIALES
Quebrada El Salto
Quebrada Toyo
(Joins sheet 22)
AnC
ByB
RtF
SmF
VeB
VcC2
ClF2
EcB
BcB
BcC
CIE2
CID2
NaD
NaE
NaF
JuD2
MoC2
MoD2
PhD2
PhC2
JuE2
SoD
SoF
SrF
Cn
633
643


(Joins sheet 15)
N
RÍO ARRIBA
NADO AFUERA
QUEBRADA
Quebrada El Toro
ARENAS
Hicotea
MUNICIPIO DE
MOROVIS
MUNICIPIO DE VEGA BAJA
FRANQUEZ
Quebrada Grande
Río Morovis
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
60 000 METERS
154 000 METERS
(Joins sheet 24)
(Joins sheet 31)


(Joins sheet 16)
RÍO ARRIBA
ALMIRANTE SUR
UNIBÓN
MUNICIPIO DE VEGA BAJA
MUNICIPIO DE MOROVIS
Miranda
Cueva Manahena
Río Indio
Río Morquis
Unibón
Quebrada El Toro
Quebrada Arenas
Quebrada Las Lajas
Quebrada Lagunita
Quebrada Muñoz Solo
(Joins sheet 23)
(Joins sheet 32)
1 Mile
5000 Feet
60 000 METERS
156 000 METERS
N


162 000 METERS
62 000 METERS
BAJURA
ALMIRANTE NORTE
CANDELARIA
MARICAO
MAVILLA
MUNICIPIO DE COROZAL
MUNICIPIO DE VEGA ALTA
MUNICIPIO DE VEGA BAJA
CIBUCO
RIO
Cibuco
Mavilla
Rio
(Joins sheet 25)
RtF
AnB
SmF
EcC
VcB
VcC2
AnC
CmF2
CIF2
CIE2
To
NaD
Ur
SmF
JuD2
PhC2
GeC
JoC
EcB
SnC
SoF
647
677
674


164 000 METERS
(Joins inset)
62 000 METERS
(Joins sheet 24)
60 000 METERS
166 000 METERS
MARICAO
MUNICIPIO DE VEGA ALTA
MUNICIPIO DE COROZAL
MUNICIPIO DE TOA ALTA
MUNICIPIO DE DORADO
Río Lajas
Quebrada Honda
SmF
AnB
AnC
VcC2
CIE2
CIF2
VcB
EcB
EcC
SnC
CmF2
RtF
SoF
678
679
677
820



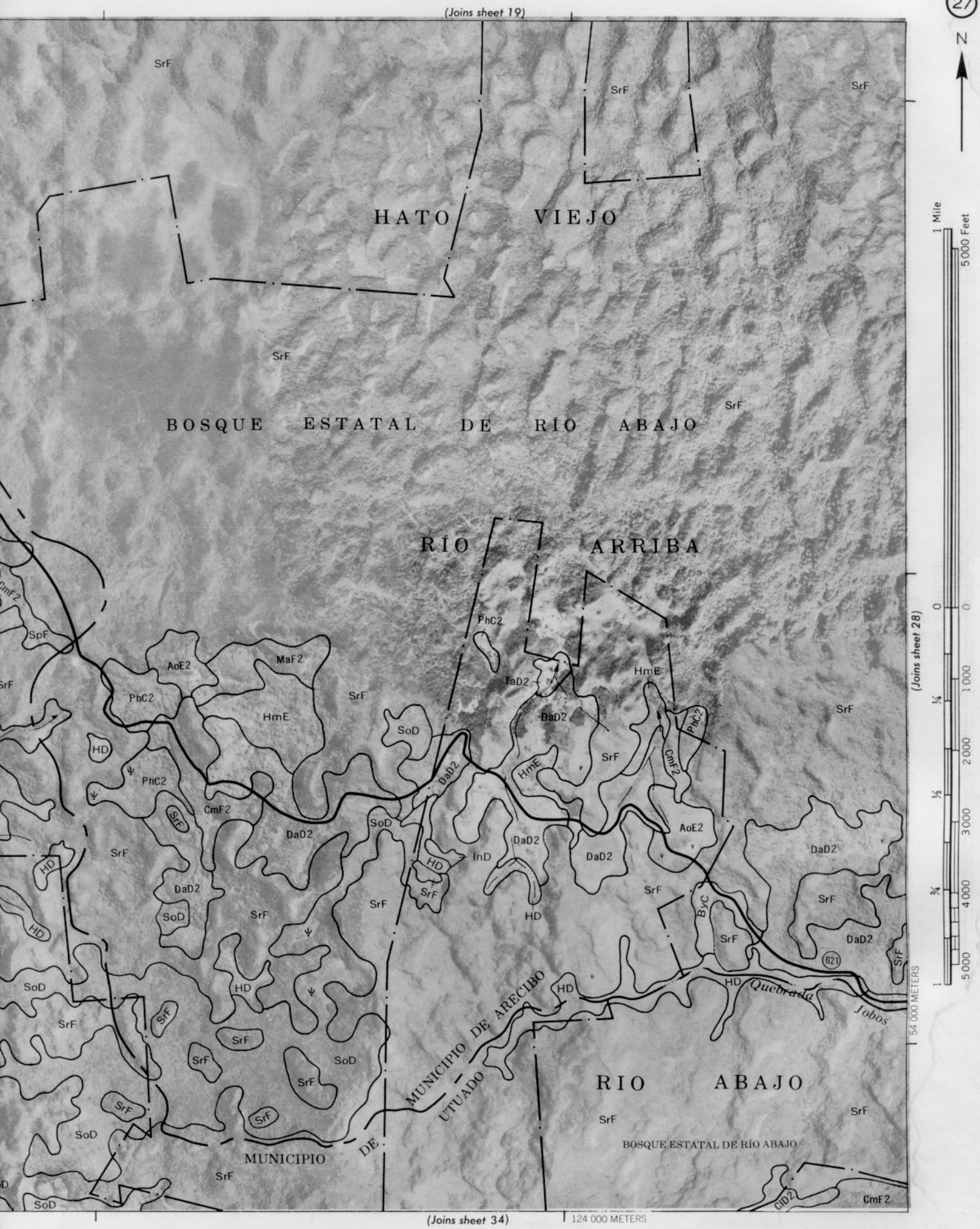
N

1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1


N
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
54 000 METERS
(Joins inset, sheet 45)
(Joins sheet 18)
(Joins sheet 33)
112 000 METERS
QUEBRADA
MUNICIPIO DE CAMUY
MUNICIPIO DE HATILLO
MUNICIPIO DE LARES
MUNICIPIO
BAYAN
ÁNGEL
Río Camuy
Camuy
Río
Quebrada
SgD
SoF
CmF2
SpD
SpF
SoD
CIF2
SoF
SoD
SoF
SoD
SoF
SrF
SoF
SrF
SrF
SpD
SpD
SpD
RtF
SpD
SpD
SrF
AnC
JuD2
AnC
JuD2
EcB
SpD
RtF
AnB
AnC
SrF
RtF
To
To
JuD2
SrF
SrF
SrF
SpF
SpD
SoD
SpD
SoF
SrF
RtF
CIE2
CIF2
SoF
SoD
SoF
SmF
SoD
CIF2
PhD2
CIF2
SoD
SoF
SoD
SoF
SoF
SoD
SoD
SoF
SoD
SrF
SpD
SoD
SpD
SoD
SpF
SpD
SoF
SrF
134
129
486
455


116 000 METERS
58 000 METERS
AIBONITO
ESPERANZA
BAYANEY
SANTA ROSA
ÁNGELES
MUNICIPIO DE HATILLO
MUNICIPIO DE ARECIBO
MUNICIPIO DE UTUADO
DE UTUADO
Tanamá
Río Tanamá
Río
(Joins sheet 27)
CIF2
CIE2
PhD2
PhC2
SoF
SoD
SrF
EcB
EcC
AnC
ByC
SpD
TaD2
JuD2
HmE
Re
489
489R


118 000 METERS
58 000 METERS
ESPERANZA
SANTA ROSA
CAGUANA
Observatorio de Arecibo
Río Tanamá
MUNICIPIO DE ARECIBO
MUNICIPIO DE UTUADO
(Joins sheet 26)
SoD
SoF
ClF2
SrF
AnC
TaD2
EcB
BvC
CmF2
DaD2
HmE
AoE2
SpF
EcC
SoC
EbB
HD
621
625


(Joins sheet 19)
HATO VIEJO
BOSQUE ESTATAL DE RÍO ABAJO
RÍO ARRIBA
MUNICIPIO DE ARECIBO
UTUADO
DE
MUNICIPIO
RIO ABAJO
BOSQUE ESTATAL DE RÍO ABAJO
Quebrada Jobos
621
(Joins sheet 28)
(Joins sheet 34)
124 000 METERS
54 000 METERS
1 Mile
5000 Feet
N
27
SrF
SoD
HD
PhC2
CmF2
DaD2
HmE
AoE2
MaF2
SpF
TaD2
InD
ByC
CID2


(Joins sheet 20)
N
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1
(Joins sheet 27)
54 000 METERS
126 000 METERS
(Joins sheet 35)
BOSQUE ESTATAL DE RÍO ABAJO
RÍO ARRIBA
RÍO ABAJO
CARRERAS
RÍO GRANDE DE ARECIBO
LAGO DOS BOCAS
Dos Bocas
Central Hidroeléctrica
Quebrada Saltillo Jobos
Jobos
MUNICIPIO DE ARECIBO
MUNICIPIO DE UTUADO
CANIACO
DON
AI
RtF
SmF
Re
Rm
TaD2
EcC
Vm
ByC
CmF2
ClD2
DaD2
SpF
MpF2
CpE
MuF
HmE
HmF
CbF
SrF
AnB
PhD2
JuD2
HD
DaD2
CmF2
SoD
ClF2
MpF2
AoF2
AoE2
AoD2
621
10
146


132 000 METERS
58 000 METERS
SmF
EcC
RtF
SmF
EcB
SoF
EcB
RtF
SmF
EcB
EcB
EcB
EcB
RtF
RtF
RtF
SABANA
HOYOS
TaD2
HmE
HmE
DaD2
RtF
RtF
HmE
DaD2
DaD2
HmE
RtF
HmE
DaD2
RtF
HmF
RtF
SpD
HmE
SrF
146
HmF
Cn
HmF
MuF
MaF2
SrF
MpF2
CbF
LIMÓN
MaF2
AoF2
MaF2
AoE2
MpF2
HmF
AoF2
AoF2
HmF
RÍO
ALONSO
MpF2
MaF2
MaF2
CmF2
MaF2
CmF2
AoF2
HmF
HmF
MaF2
MuF
MuF
AoE2
(Joins sheet 29)


134 000 METERS
58 000 METERS
(Joins sheet 28)
SABANA HOYOS
MUNICIPIO DE ARECIBO
MUNICIPIO DE BARCELONETA
MUNICIPIO DE UTUADO
MUNICIPIO DE CIALES
LIMÓN
MUNICIPIO DE UTUADO
MAMEYES ABAJO
DON ALONSO
Hacienda Las Abras
Hacienda Piedra Gorda
Río Limón
Río
La Re Vente
Yúnes
SgF
AnC
AnB
EcB
EcC
RtF
SgD
ByB
ByC
HmE
SpD
SpF
HmF
MuF
Re
MaF2
AoF2
SoD
CmF2
146
140

(Joins sheet 21)

(Joins sheet 30)

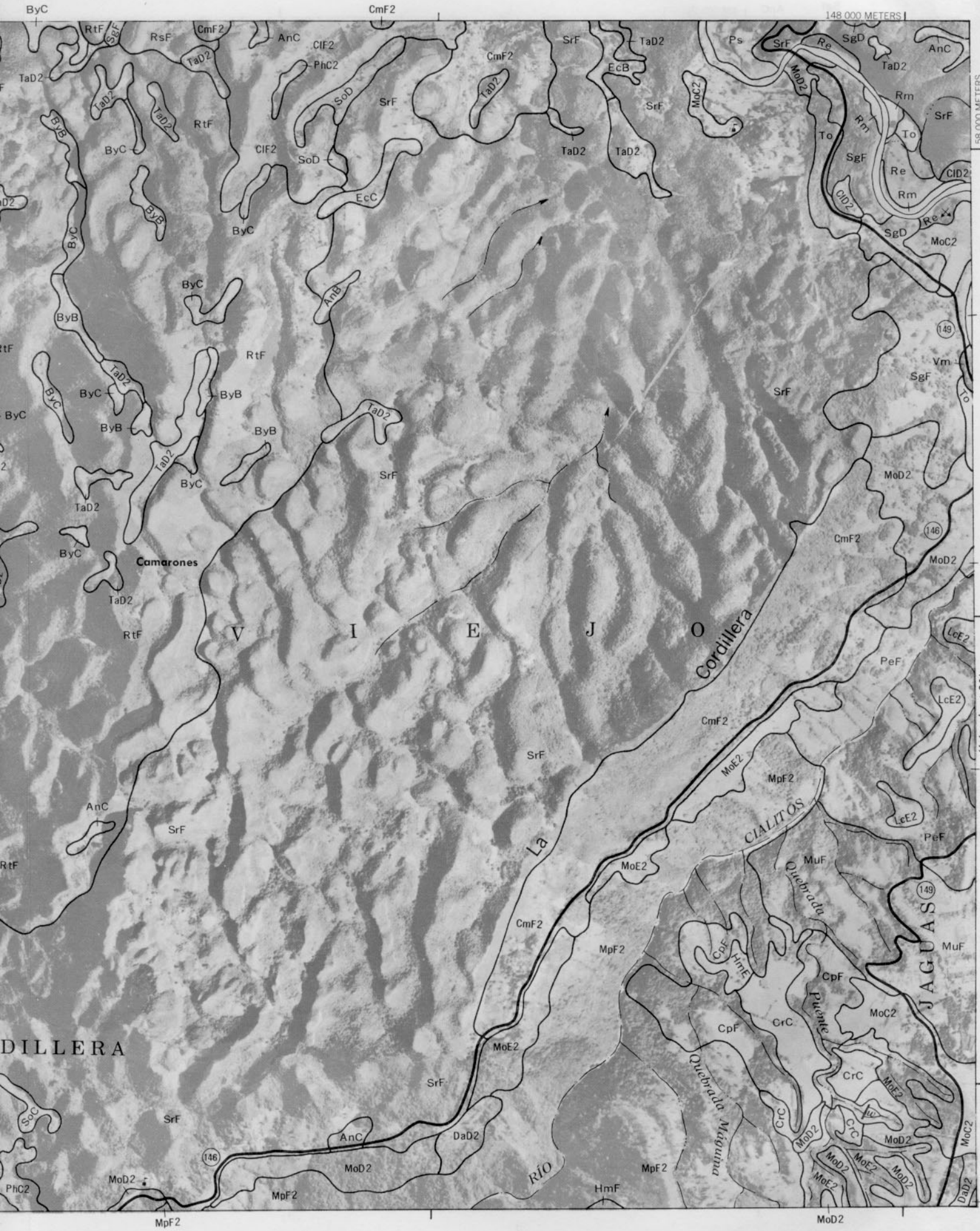
(Joins sheet 36)

29

N

1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
54 000 METERS
140 000 METERS

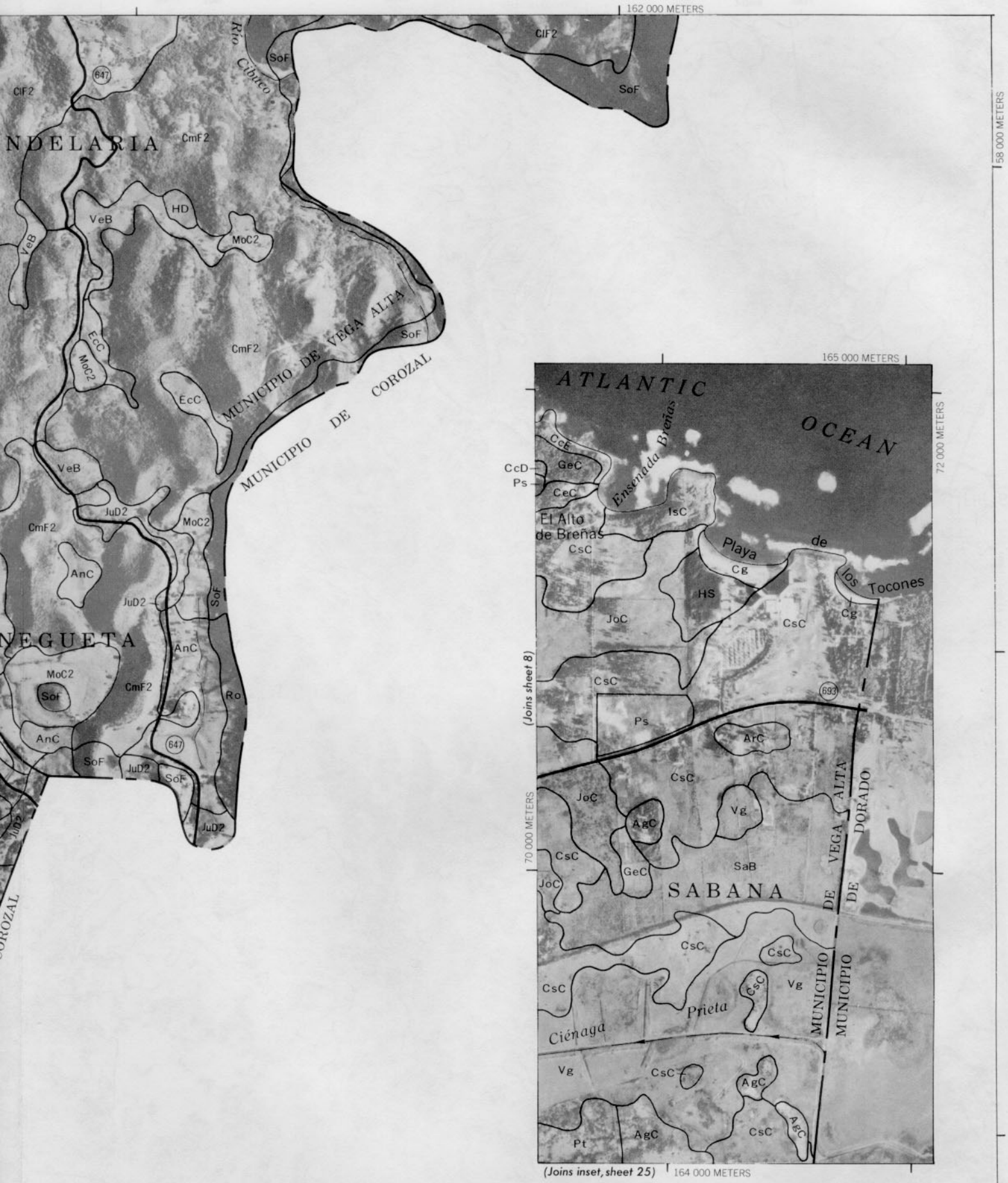
ARECIBO AREA, PUERTO RICO

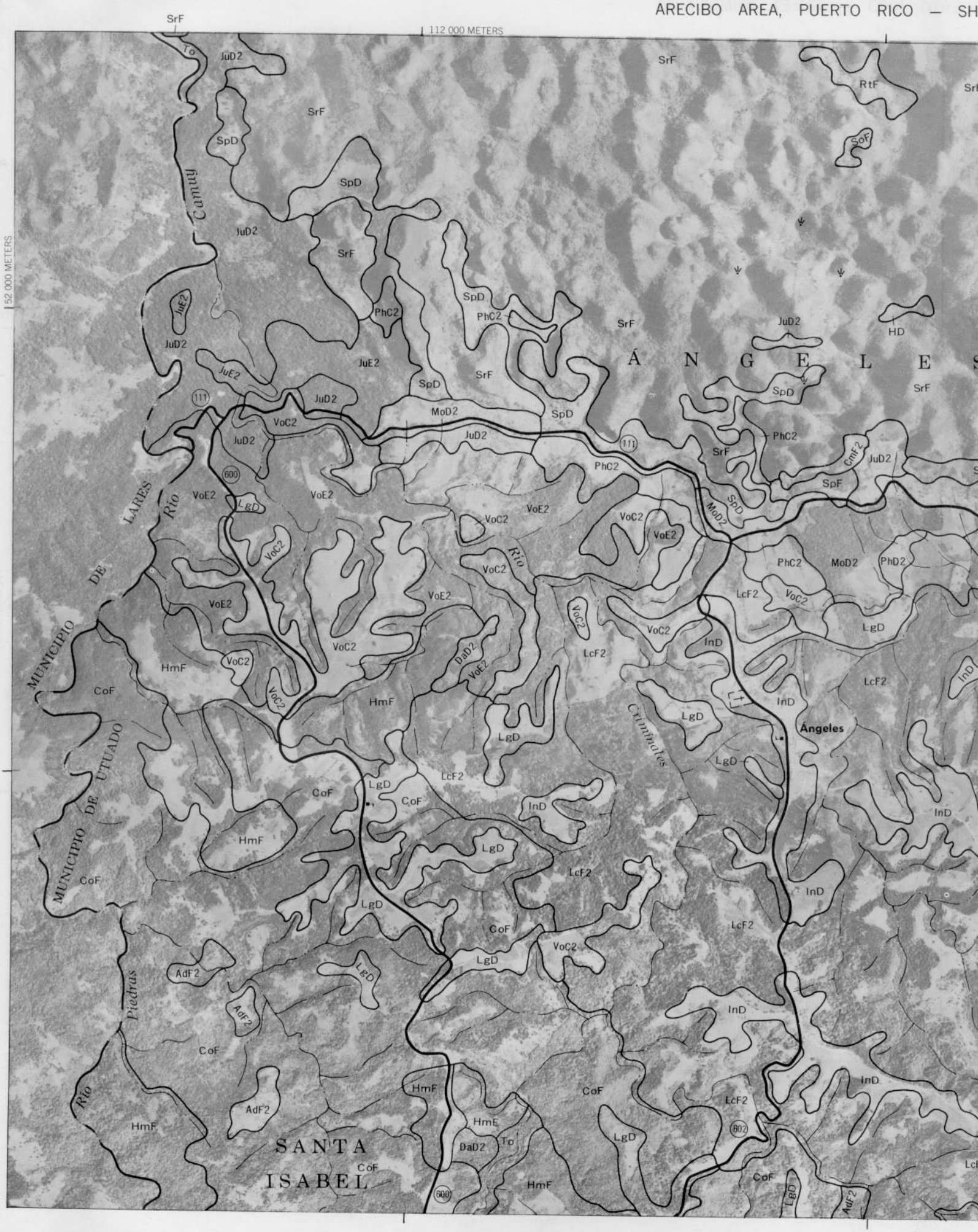

148 000 METERS
58 000 METERS
Camarones
V I E J O
Cordillera
La
CIALITOS
Quebrada
JAGUAS
Puente
Quebrada Miaquina
RÍO
(Joins sheet 31)
DILLERA
ByC
RtF
SgF
RsF
CmF2
AnC
ClF2
PhC2
TaD2
SoD
SrF
EcC
EcB
ByB
AnB
Ps
SgD
Re
MoD2
Rm
To
SgF
ClD2
MoC2
149
Vm
InD
146
LcE2
PeF
MoE2
MpF2
MuF
CpF
HmE
CrC
DaD2
HmF
SoC
PhC2

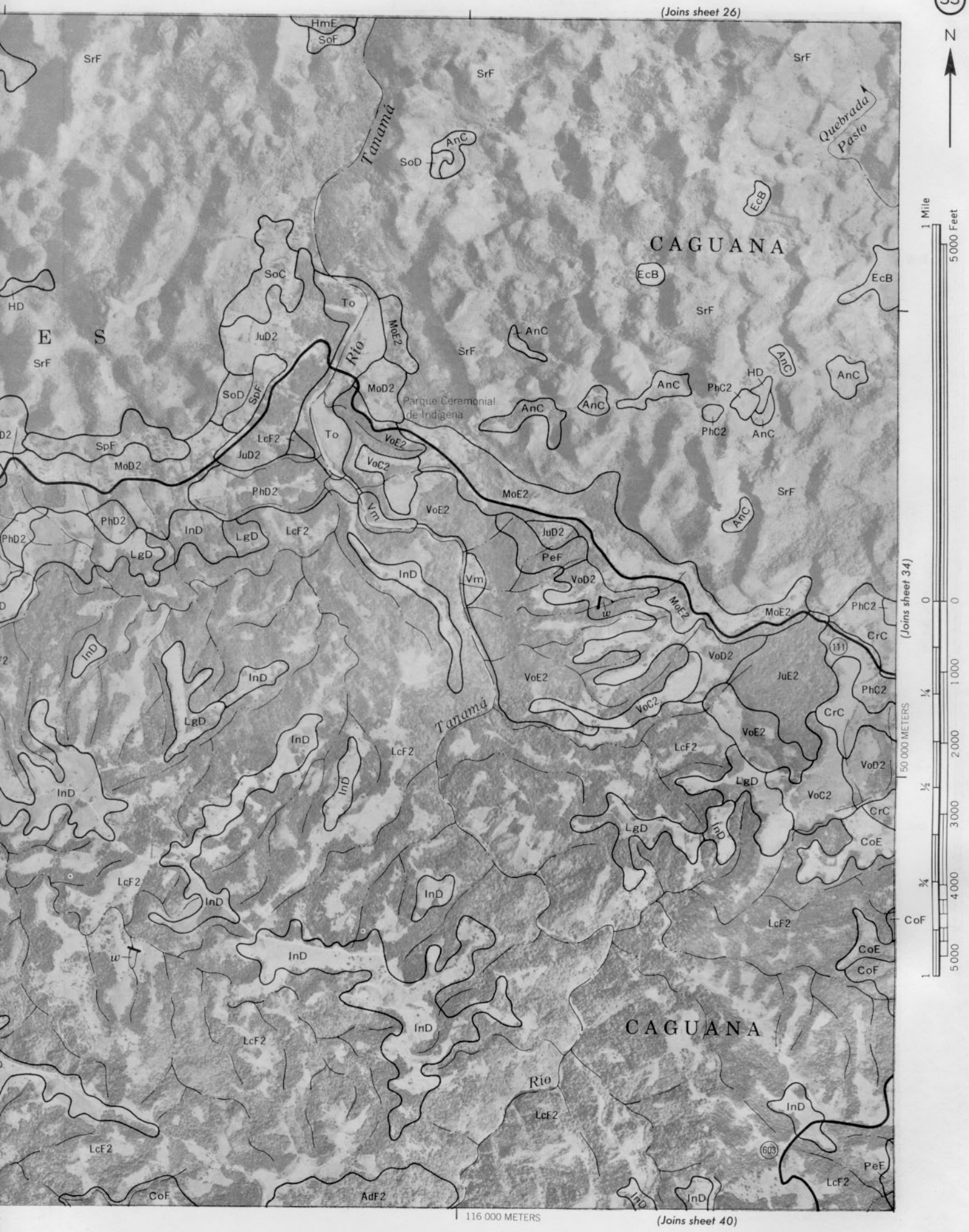

150 000 METERS
58 000 METERS
(Joins sheet 30)
HATO VIEJO
BARAHONA
TORRECILLAS
JAGUAS
CIALES
MUNICIPIO DE CIALES
MUNICIPIO DE MOROVIS
Quebrada Los Quiñones
Río Grande de Manatí
Quebrada Vales Coto
Quebrada del Riego
Quebrada del Suro
Cerro Purrón
Torrec
SrF
NaE
MoD2
JuD2
PhD2
PhC2
MoC2
SoD
SoF
TaD2
AnC
VcC2
SpD
EcB
SgD
SgF
SoC
SnC
AnB
HD
VoC2
ByC
InD
PeF
LcF2
LcE2
MuF
DaD2
HmF
CbF
MaF2
InE
Rm
Re
Ps
Vm
To
CmF2
CID2
MoD2
(633)
(155)
(149)
(146)
(56)


(Joins sheet 23)
31
N
F R A N Q U E Z
MOROVIS NORTE
MOROVIS SUR
MOROVIS
Torrecillas
Quebrada Grande de Morovis
Quebrada Torres
Quebrada Franquez
Rio Morovis
Rio Morovis
Morovis
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
54 000 METERS
154 000 METERS
(Joins sheet 32)
(Joins sheet 38)
155
567
617
159
PhC2
MoC2
SnC
ClF2
SoD
SpD
SrF
AnB
EcB
SoC
VcB
SpF
JuD2
TaC2
AnC
MoD2
SoF
PhD2
To
InD
VoC2
VoD2
PeF
LcF2
LcE2
InE

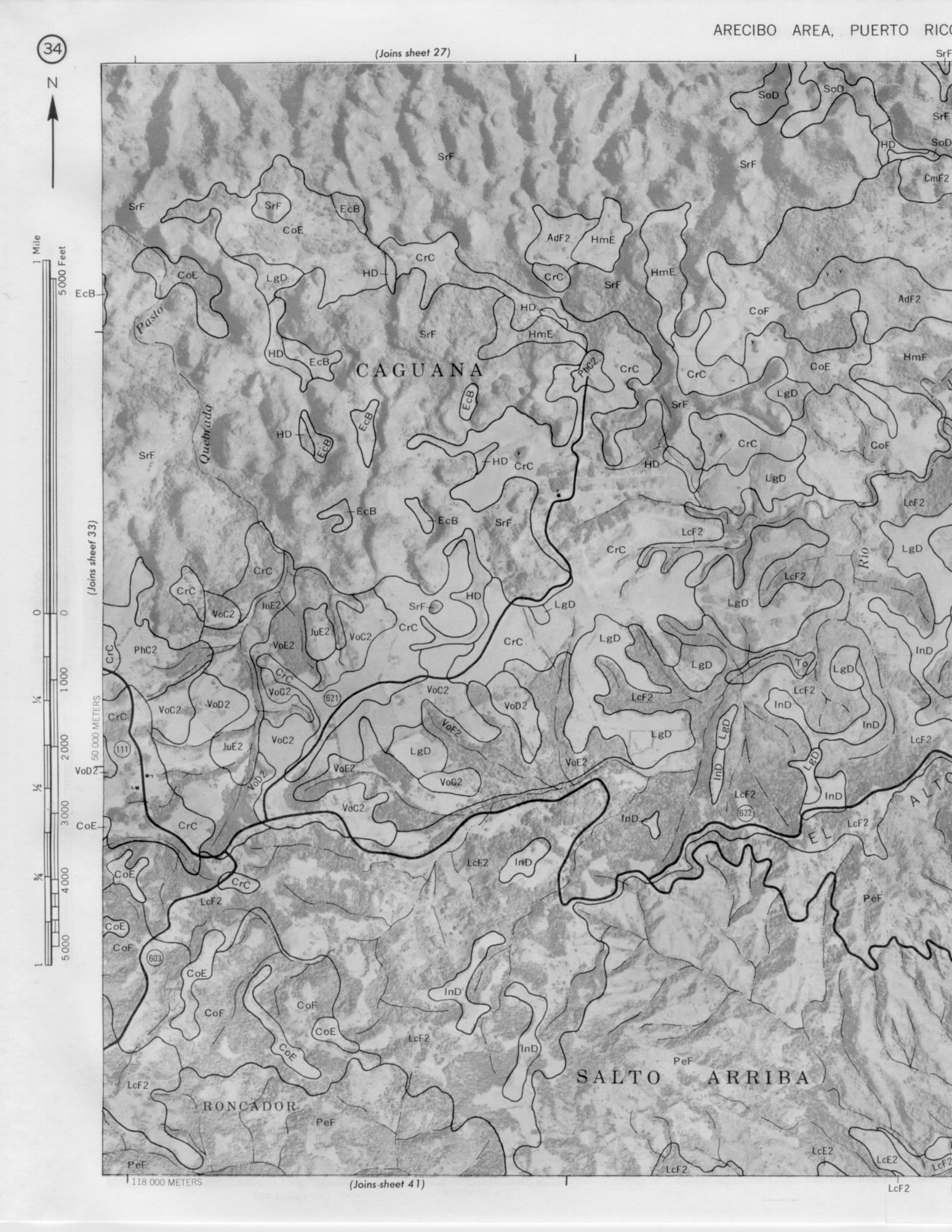

(Joins sheet 24)
ALMIRANTE SUR
CANDELA
MUNICIPIO DE VEGA BAJA
MUNICIPIO DE VEGA ALTA
MUNICIPIO DE MOROVIS
MUNICIPIO DE COROZAL
UNIBÓN
MONTE LLANO
Río Unibón
Río Las Cuevas
Quebrada
Monte Llano
(Joins sheet 31)
(Joins sheet 39)
54 000 METERS
156 000 METERS
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
N

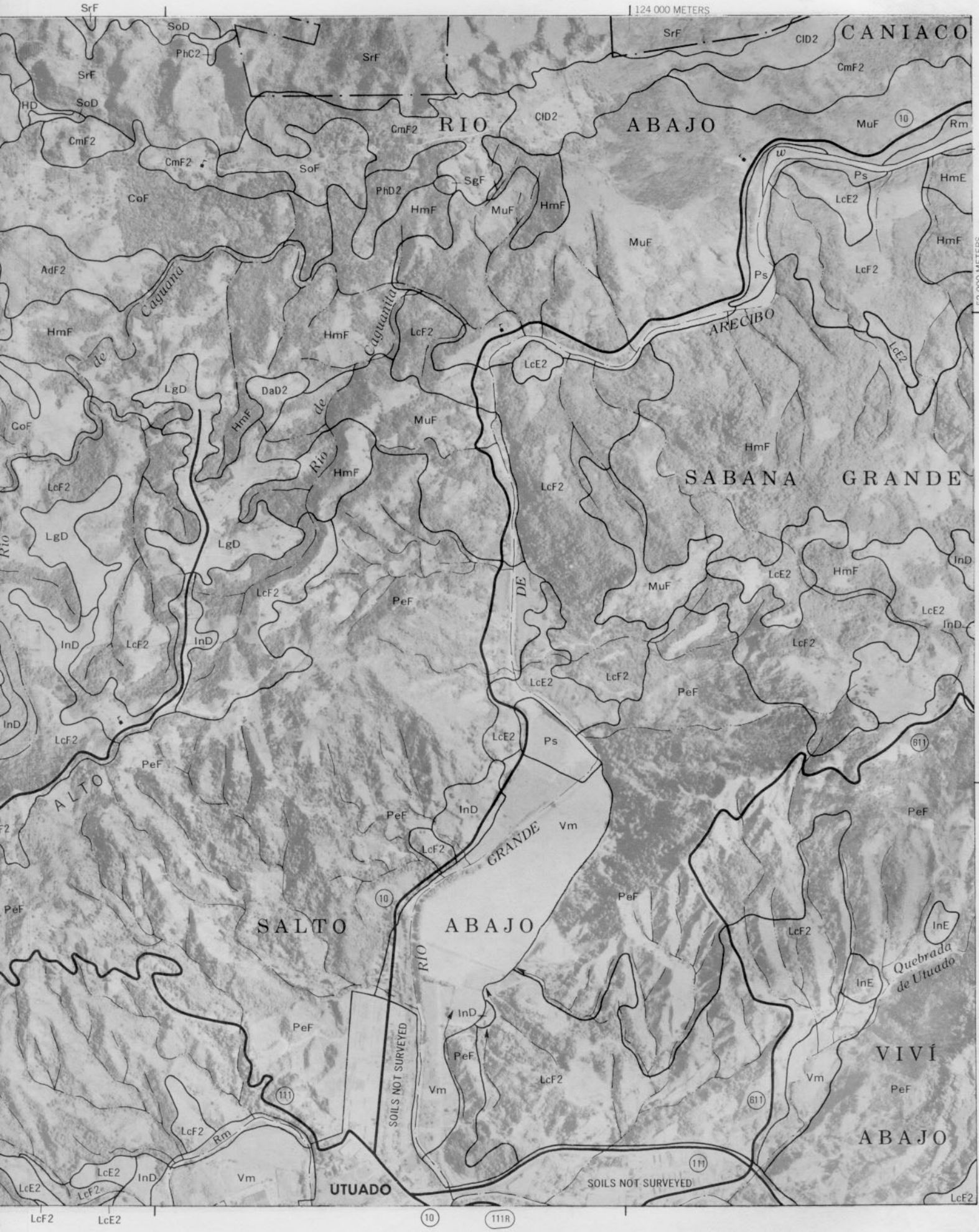

162 000 METERS
165 000 METERS
58 000 METERS
72 000 METERS
70 000 METERS
ATLANTIC OCEAN
Ensenada Breñas
Río Cibuco
NDELARIA
MUNICIPIO DE VEGA ALTA
MUNICIPIO DE COROZAL
OROZAL
NEGUETA
El Alto de Breñas
Playa de los Tocones
SABANA
Ciénaga Prieta
MUNICIPIO DE VEGA ALTA
MUNICIPIO DE DORADO
(Joins sheet 8)
(Joins inset, sheet 25)
164 000 METERS
1000 AND 2000-METER GRID TICKS
CmF2
SoF
ClF2
VeB
HD
MoC2
EcC
JuD2
AnC
Sof
Ro
CcE
GeC
CcD
Ps
CeC
IsC
CsC
Cg
HS
JoC
ArC
Vg
AgC
SaB
Pt
693
647


112 000 METERS
52 000 METERS
Río Camuy
Río Criminales
Río Piedras
Río Lares
MUNICIPIO DE LARES
MUNICIPIO DE UTUADO
Ángeles
SANTA ISABEL
SrF
JuD2
SpD
JuE2
PhC2
MoD2
VoC2
VoE2
LgD
HmF
CoF
LcF2
InD
AdF2
DaD2
PhD2
CmF2
RtF
SoF
HD
To
111
600
602


(Joins sheet 26)
33
N
HmE
SoF
SrF
Tamamá
SoD
AnC
Quebrada
Pasto
EcB
CAGUANA
SoC
To
MoE2
JuD2
Río
HD
E
S
SrF
SpF
MoD2
Parque Ceremonial de Indígena
PhC2
LcF2
VoE2
VoC2
PhD2
Vm
InD
LgD
PeF
VoD2
JuE2
CrC
CoE
CoF
AdF2
603
111
1 Mile
5000 Feet
(Joins sheet 34)
50 000 METERS
116 000 METERS
(Joins sheet 40)

ARECIBO AREA, PUERTO RICO




124 000 METERS
52 000 METERS
CANIACO
RIO ABAJO
SABANA GRANDE
SALTO ABAJO
VIVÍ ABAJO
UTUADO
ARECIBO
Caguana
Caguanita
Río de Caguana
Río Grande de Arecibo
Río Grande de Utuado
Quebrada de Utuado
SOILS NOT SURVEYED
SOILS NOT SURVEYED
(Joins sheet 35)
SrF
SoD
PhC2
HD
CmF2
SoF
CoF
PhD2
SgF
HmF
MuF
CID2
Rm
Ps
HmE
LcE2
LcF2
AdF2
LgD
DaD2
InD
InE
PeF
Vm
10
111
111R
611


126 000 METERS
52 000 METERS
(Join: sheet 34)
RÍO ABAJO
CANIACO
DON
SABANA GRANDE
VIVÍ ABAJO
La Playa
LAGO DOS BOCAS
Quebrada
Río
LAGO CAONILLAS
CmF2
HmF
MuF
Rm
DaD2
CpF
HmE
AoF2
AoE2
CpE
LcF2
LcE2
InD
InE
PeF
AoD2
610
611
612
607
140


(Joins sheet 28)
CmF2
MpF2
LAGO DOS BOCAS
ALONSO
MaF2
AoF2
HmF
HmE
MuF
CpF
Ps
Caonillas
Central Hidroeléctrica
Río Limón
Cuchilla
Buena vista
Palmarejo
PeF
LcF2
LgE
LgD
InD
CpE
612
613
607
140
CAONILLAS ABAJO
TETUÁN
(Joins sheet 36)
(Joins sheet 42)
1 Mile
5000 Feet
50 000 METERS
132 000 METERS
N
35


N
1 Mile
5000 Feet
0
0
¼
1000
½
2000
¾
3000
1
4000
5000
50 000 METERS
134 000 METERS
(Joins sheet 29)
(Joins sheet 35)
(Joins sheet 43)
AoF2
DON ALONSO
MAMEYES
ABA
MA
MUNICIPIO DE UTUADO
MUNICIPIO DE JAYUYA
Río Limón
Río La Venta
Río Palmarejo
Río
Hacienda La Isolina
Hacienda Butler
Hacienda Limón
Hacienda Tetuán
Hacienda La Catalana
Hacienda Vega Grande
MuF
SpF
HmE
HmF
LgD
DaD2
MpF2
Ur
CpF
CpE
LgE
LgF
To
140
141
613

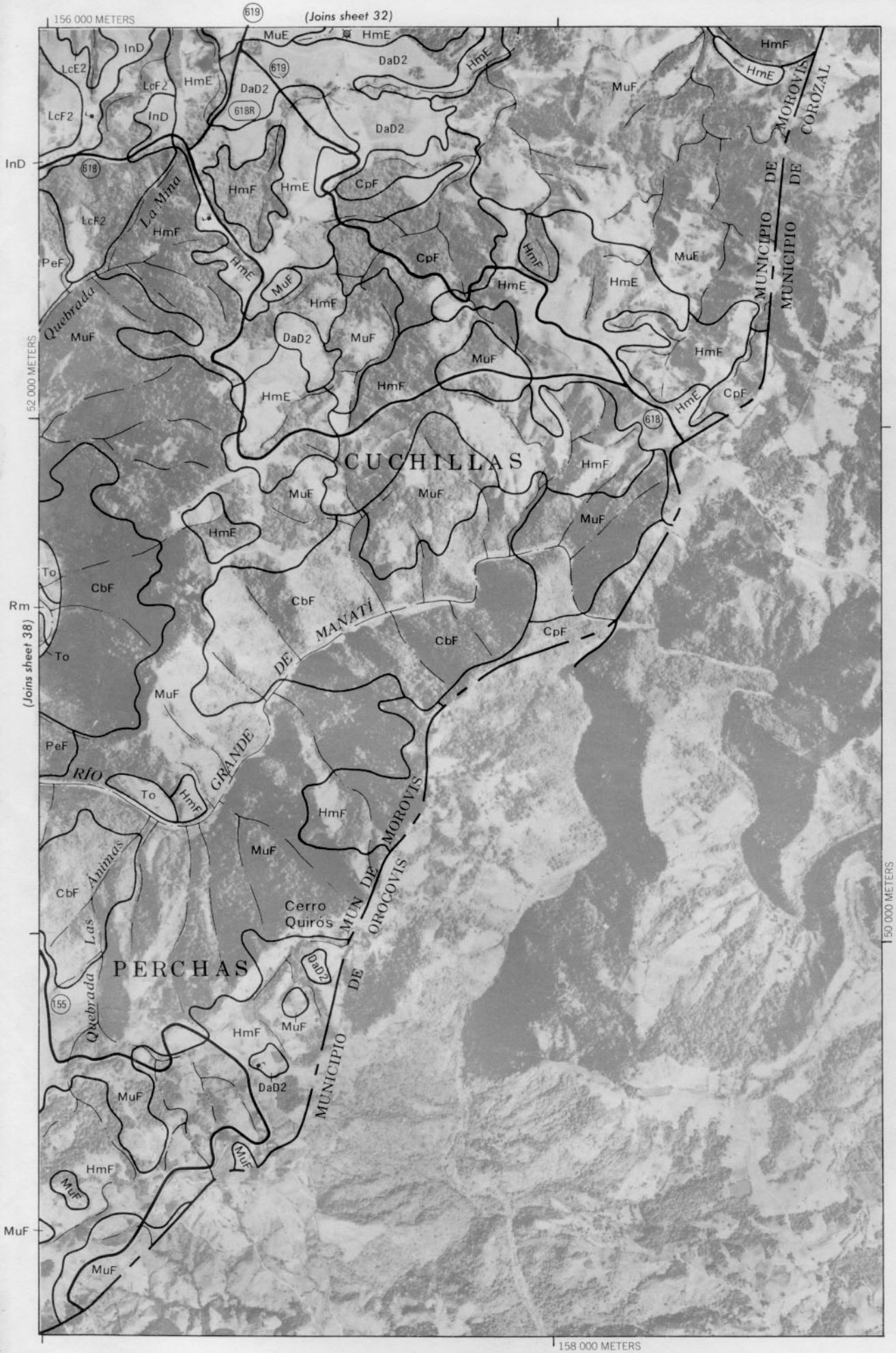

140 000 METERS
52 000 METERS
Río Quebrada de Yeguadilla
MaF2
HmE
CrC
RtF
HmF
MoD2
Segui
146
MoC2
MUNICIPIO DE UTUADO
MUNICIPIO DE CIALES
Yúnes
ABAJO
MuF
VoC2
VoE2
PhD2
MaF2
FRONTÓN
AoD2
AoF2
Hacienda Marques
CpF
CpE
MpF2
MUNICIPIO DE JAYUYA
CaF
608
LgE
Río
Hacienda Reynés
Ps
MAMEYES
ARRIBA
Loma de la Zarza
Naranjito
141
LgF
To
Quebrada del Bellaco
CIALITOS
Hacienda Garau
(Joins sheet 37)

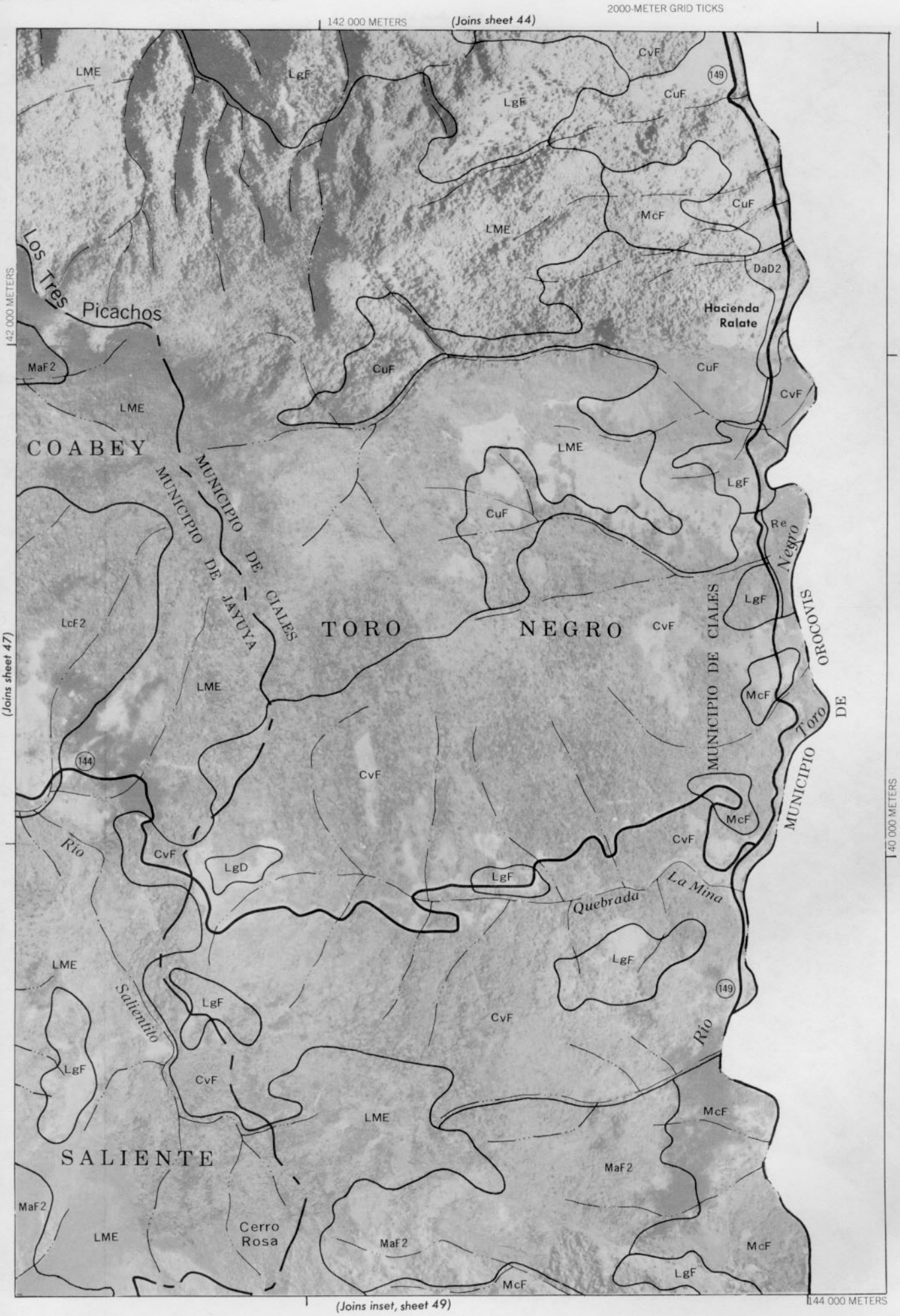

142 000 METERS
52 000 METERS
(Joins sheet 36)
CORDILLERA
FRONTÓN
CIALITOS
TORO NEGRO
Hacienda Santa Elena
Hacienda Peñonales
Hacienda Aldea
Hacienda Flor de Alba
Hacienda Colom
Río Barbas
Río Cialitos
Río
RtF
SrF
EcC
PhC2
SoC
MoD2
MoE2
AnC
PhD2
VoE2
VoC2
VoC
AoF2
AoE2
MpF2
CpF
AoD2
HmF
HmE
MuF
CaF
LgE
CbF
Ps
To
Rm
Re
146
608
614
149


(Joins sheet 30)
(Joins sheet 44)
(Joins sheet 38)
37
N
1 Mile
5000 Feet
50 000 METERS
148 000 METERS
Cialitos
Quebrada Honda
Quebrada Máquina
Cerro Gordo
La Chorrera
TORO NEGRO
RÍO
Quebrada Llanada
Blacho
Quebrada
E S A S
P O Z A S
TORO
EGRO
SrF
MpF2
CpF
HmF
DaD2
MoE2
MoD2
MoC2
AoD2
AoE2
MuF
CbF
Rm
Vm
To
Re
149
615

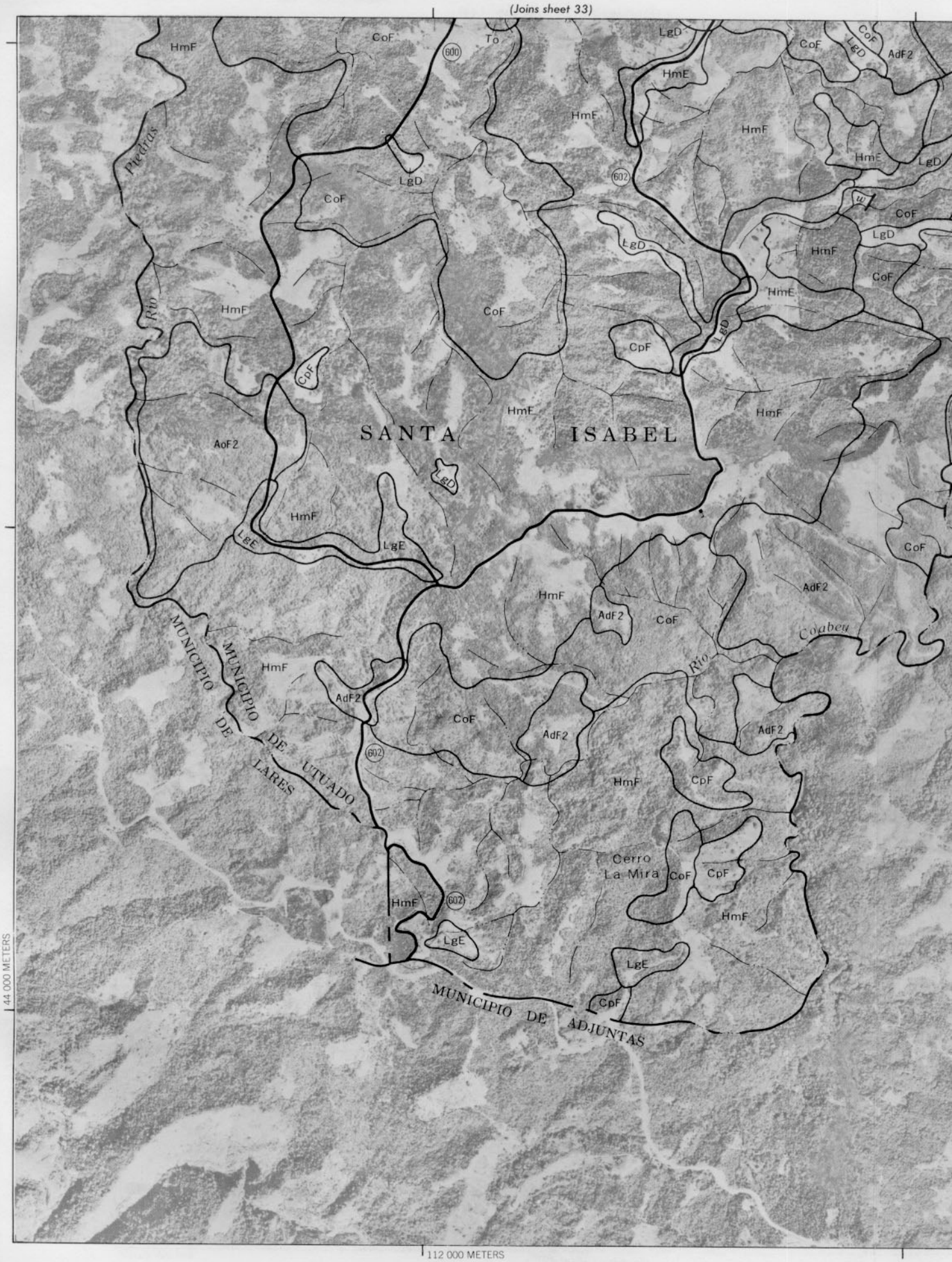

N
(Joins sheet 31)
Cerro Purrón
Quebrada Saliente
Hacienda María
Quebrada
Grande
GRANDE DE MANATÍ
RÍO
Río Negro
Toro
PESAS
Quebrada Minguillo
Río Manicaboa
MUNICIPIO DE CIALES
MUNICIPIO DE MOROVIS
Quebrada del Guano
Riachuelo
VAGA
POZAS
Bauta
Quebrada del Pozo de Magala
Río Riachuelo
SAN
P A
(Joins sheet 37)
(Joins sheet 45)
1 Mile
5000 Feet
50 000 METERS
150 000 METERS


154 000 METERS
52 000 METERS
MOROVIS SUR
CUCHILLAS
LORENZO
RIO GRANDE
S T O
P E R C H A S
Cerro Avispa
Quebrada Grande de Morovis Sur
Quebrada Honda
Quebrada San Lorenzo
Rio Grande de Manati
Quebrada del Muerto
Rio Muerto
Rio Sana
Quebrada Perchas
Quebrada Minas
(Joins sheet 39)
LcE2
LcF2
InD
InE
PeF
HmE
HmF
MuF
MuE
MpF2
DaD2
CaF
CbF
To
Re
Rm
Ps
155
617
618


156 000 METERS
(Joins sheet 32)
52 000 METERS
(Joins sheet 38)
50 000 METERS
158 000 METERS
CUCHILLAS
PERCHAS
Cerro Quirós
La Mina
Quebrada
Río Grande de Manatí
Las Ánimas
Municipio de Morovis
Municipio de Corozal
Municipio de Orocovis
InD
LcE2
LcF2
HmE
HmF
DaD2
CpF
PeF
MuE
MuF
CbF
To
Rm
618
619
618R
155


2000-METER GRID TICKS
142 000 METERS
(Joins sheet 44)
42 000 METERS
(Joins sheet 47)
40 000 METERS
144 000 METERS
(Joins inset, sheet 49)
Los Tres Picachos
Hacienda Ralate
COABEY
MUNICIPIO DE JAYUYA
MUNICIPIO DE CIALES
TORO NEGRO
MUNICIPIO DE CIALES
MUNICIPIO DE OROCOVIS
Toro Negro
Río
Quebrada La Mina
Salientito
Río
SALIENTE
Cerro Rosa
LME
LgF
CuF
CvF
McF
DaD2
MaF2
LcF2
LgD
Re
149
144

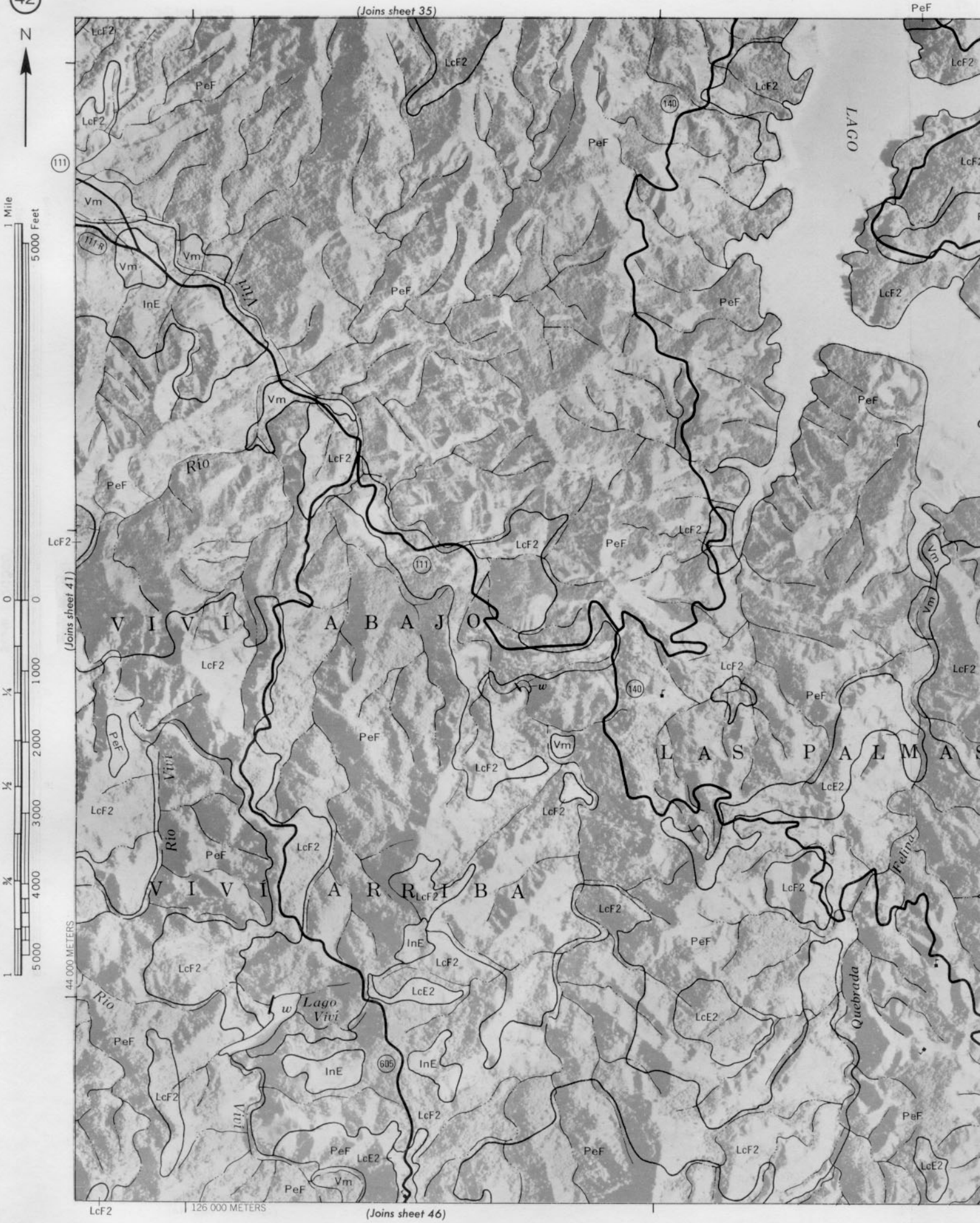
39
N
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000

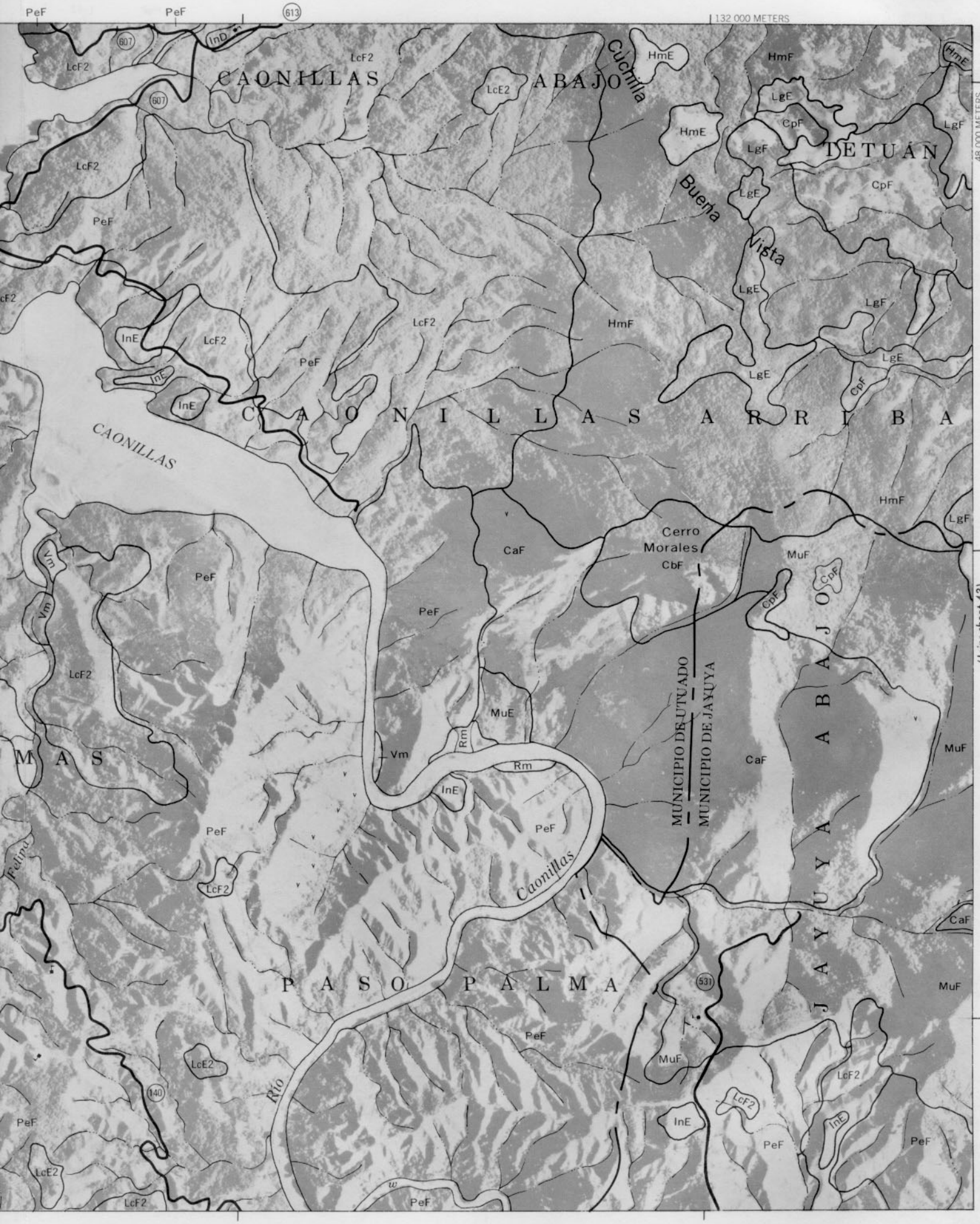

(Joins sheet 33)
N
1 Mile
5000 Feet
0
0
1000
2000
3000
4000
5000
SANTA ISABEL
Río Piedras
Río Coabey
MUNICIPIO DE LARES
MUNICIPIO DE UTUADO
MUNICIPIO DE ADJUNTAS
Cerro La Mira
600
602
HmF
HmE
CoF
LgD
LgE
CpF
AoF2
AdF2
To
44 000 METERS
112 000 METERS


116 000 METERS
48 000 METERS
ÁNGELES
CAGUANA
GUAONICA
MUNICIPIO DE UTUADO
MUNICIPIO DE ADJUNTAS
Río Tanamá
Quebrada
Pelma
La Estancita
To
603
LcF2
AdF2
CoF
LgD
LgF
HmF
HmE
LgE
InD
McF
CpF
(Joins sheet 41)


118 000 METERS
48 000 METERS
(Joins sheet 40)
RONCADOR
SALTO ARRIBA
GUAONICA
Quebrada Roncador
Guaónica
Conchita
Quebrada
Río Calorada
Río
Hacienda Tres Hermanas
Cerro Roncador
MUNICIPIO DE UTUADO
MUNICIPIO DE ADJUNTAS
603
LcF2
PeF
LcE2
InD
InE
Vm
Rm
LgE
CpF
CaF
HmF
MaF2
CuF
LgF
MuF
Re

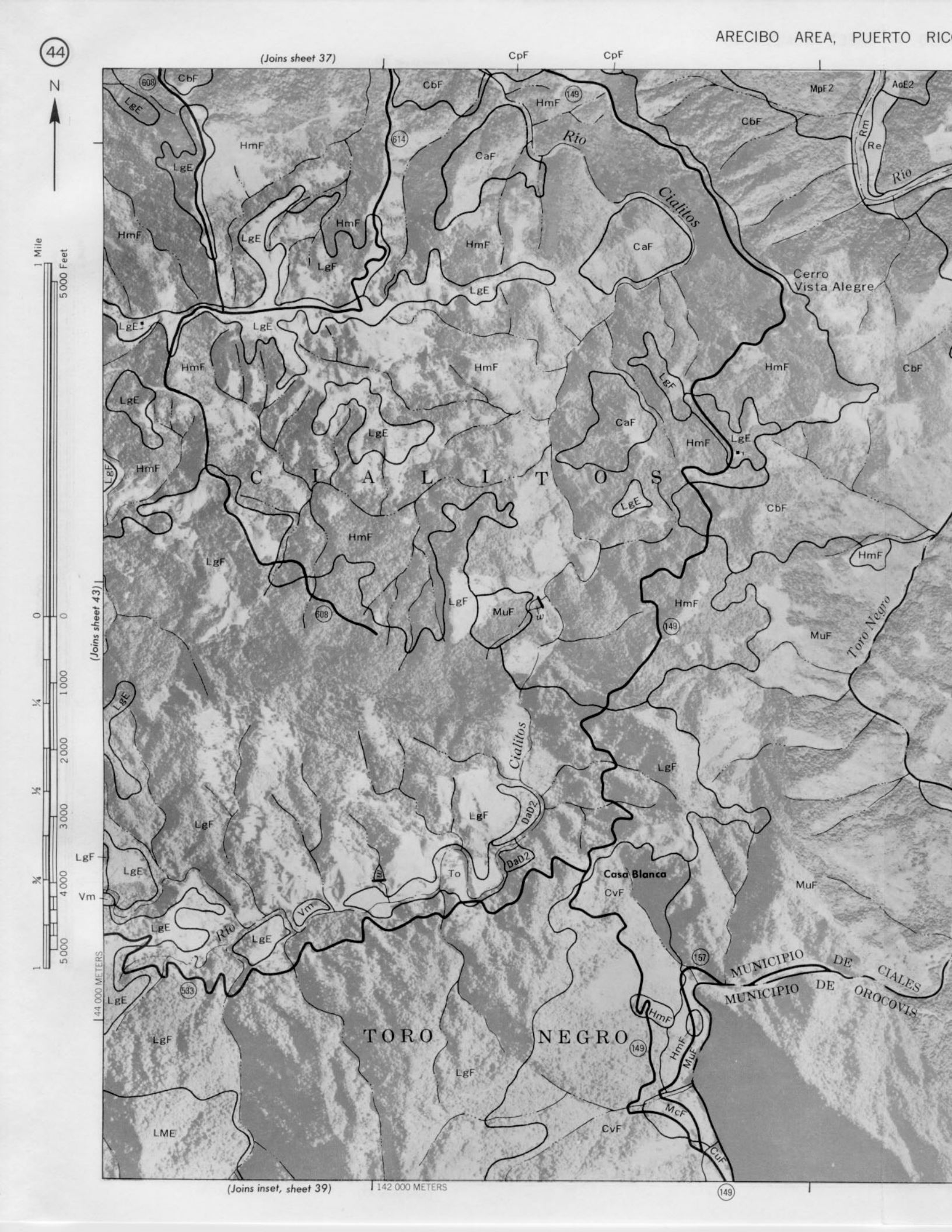

(Joins sheet 34)
UTUADO
SOILS NOT SURVEYED
El Guano
Río Grande de Arecibo
Río Viví
VIVÍ ABAJO
ARENAS
VIVÍ ARRIBA
Vm Quebrada
Arenas
Pellejas
(Joins sheet 42)
(Joins inset, sheet 48)
124 000 METERS
44 000 METERS
1 Mile
5000 Feet
N
LcF2
LcE2
PeF
InD
InE
Vm
Rm
AdF2
MaF2
Re


(Joins sheet 35)
N
1 Mile
5000 Feet
0
1000
2000
3000
4000
5000
¼
½
¾
1
(Joins sheet 41)
44 000 METERS
126 000 METERS
(Joins sheet 46)
LcF2
PeF
InE
LcE2
Vm
Río Vivi
Río
Lago Vivi
Quebrada Felino
LAGO
VIVÍ ABAJO
VIVÍ ARRIBA
LAS PALMAS
111
111R
140
605


132 000 METERS
48 000 METERS
(Joins sheet 43)
CAONILLAS ABAJO
CAONILLAS ARRIBA
PASO PALMA
JAYUYA ABAJO
DETUÁN
MAS
Cuchilla
Buena Vista
Cerro Morales
MUNICIPIO DE UTUADO
MUNICIPIO DE JAYUYA
CAONILLAS
Caonillas
Río
Felino
PeF
LcF2
LcE2
InE
InD
HmE
HmF
LgE
LgF
CpF
CaF
MuE
MuF
CbF
Vm
Rm
607
613
531
140


134 000 METERS
48 000 METERS
(Joins sheet 42)
TETUÁN
MAMEYES ARRIBA
JAYUYA ABAJO
RIO
COABEY
Charco del Muerto
Limón
Quebrada
Río JAYUYA
MUNICIPIO DE UTUADO
MUNICIPIO DE UTUADO
Cerro Magoyo
Cerro Palo de Café
530
141
HmF
HmE
CpF
LgE
LgF
MuF
CaF
DaD2
LcF2
InD
InE
PeF
Vm
Re
To

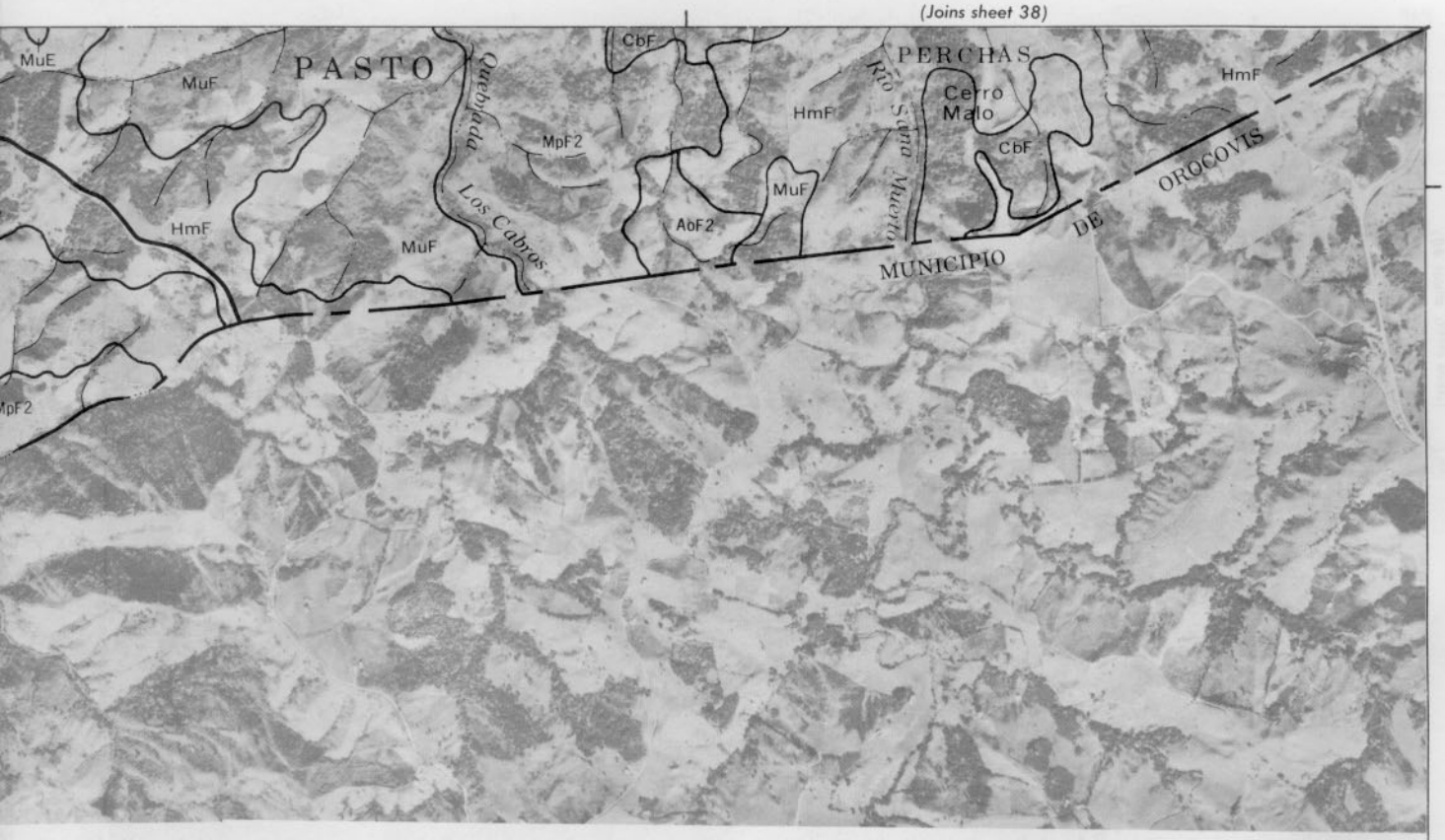

(Joins sheet 36)
43
N
Río
Vm
MuF
DaD2
To
HmF
LgE
CpF
HmE
Naranjito
Yúnes
Quebrada
Muro
Rm
CIALITOS
Hacienda
Santa Bárbara
CIALES
JAYUYA
MUNICIPIO DE
de las Vacas
Hacienda
La Marina
LgF
AoF2
MaF2
PeF
LME
GRANDE
RIO
ABEY
533
141
(Joins sheet 44)
(Joins sheet 47)
1 Mile
5000 Feet
44 000 METERS
140 000 METERS


N
(Joins sheet 37)
CpF
CpF
608
CbF
CbF
LgE
HmF
149
MpF2
AgE2
HmF
614
CaF
Río
CbF
Rm
Re
Río
Cialitos
HmF
LgE
HmF
LgF
HmF
CaF
Cerro
Vista Alegre
LgE
LgE
HmF
HmF
HmF
CbF
LgF
LgE
CaF
LgE
HmF
LgE
LgF
HmF
C I A L I T O S
LgE
CbF
HmF
LgF
(Joins sheet 43)
608
LgF
MuF
HmF
149
MuF
Toro Negro
LgE
Cialitos
LgF
LgF
DaD2
LgF
DaD2
LgF
LgE
To
Casa Blanca
MuF
Vm
CvF
Vm
LgE
Río
LgE
157
MUNICIPIO DE CIALES
MUNICIPIO DE OROCOVIS
533
LgE
HmF
TORO NEGRO
149
HmF
MuF
LgF
LgF
McF
LME
CvF
CuF
(Joins inset, sheet 39)
142 000 METERS
149
1 Mile
5000 Feet
0
0
¼
1000
½
2000
¾
3000
1
4000
5000
44 000 METERS


148 000 METERS
48 000 METERS
(Joins sheet 45)
POZAS
MUNICIPIO DE CIALES
MUNICIPIO DE OROCOVIS
Río Toro Negro
Quebrada
Río Pozas
Río Matrullas
Quebrada Muda
Quebrada Riachuelo
AoE2
MpF2
MuF
CbF
HmF
Re
Rm
615


MuF
150 000 METERS
CpF
Quebrada
CpF
MuF
HmF
LgE
HmF
MuE
MpF2
MpF2
Quintero
567
48 000 METERS
Río
VAGA
MuF
MpF2
POZAS
MUNICIPIO DE MOROVIS
MpF2
Cerro
Cedro
El Gato
Quebrada
Bauta
MpF2
MuF
CIALES
Cerro
El Gato
DE
MUNICIPIO
AoE2
MpF2
DE
OROCOVIS
MUNICIPIO
(Joins sheet 44)
106 000 METERS
PhC2
SoF
SoD
PhC2
SpF
CIE2
MUNICIPIO DE CAMUY
MUNICIPIO DE LA
58 000 METERS

(Joins sheet 38)



(Joins sheet 17)

(Joins sheet 26)

57 000 METERS

110 000 METERS

1000 AND 4000-METER GRID TICKS

44 000 METERS

156 000 METERS

45

N

1 Mile

5000 Feet

0 0

¼ 1000

½ 2000

¾ 3000

4000

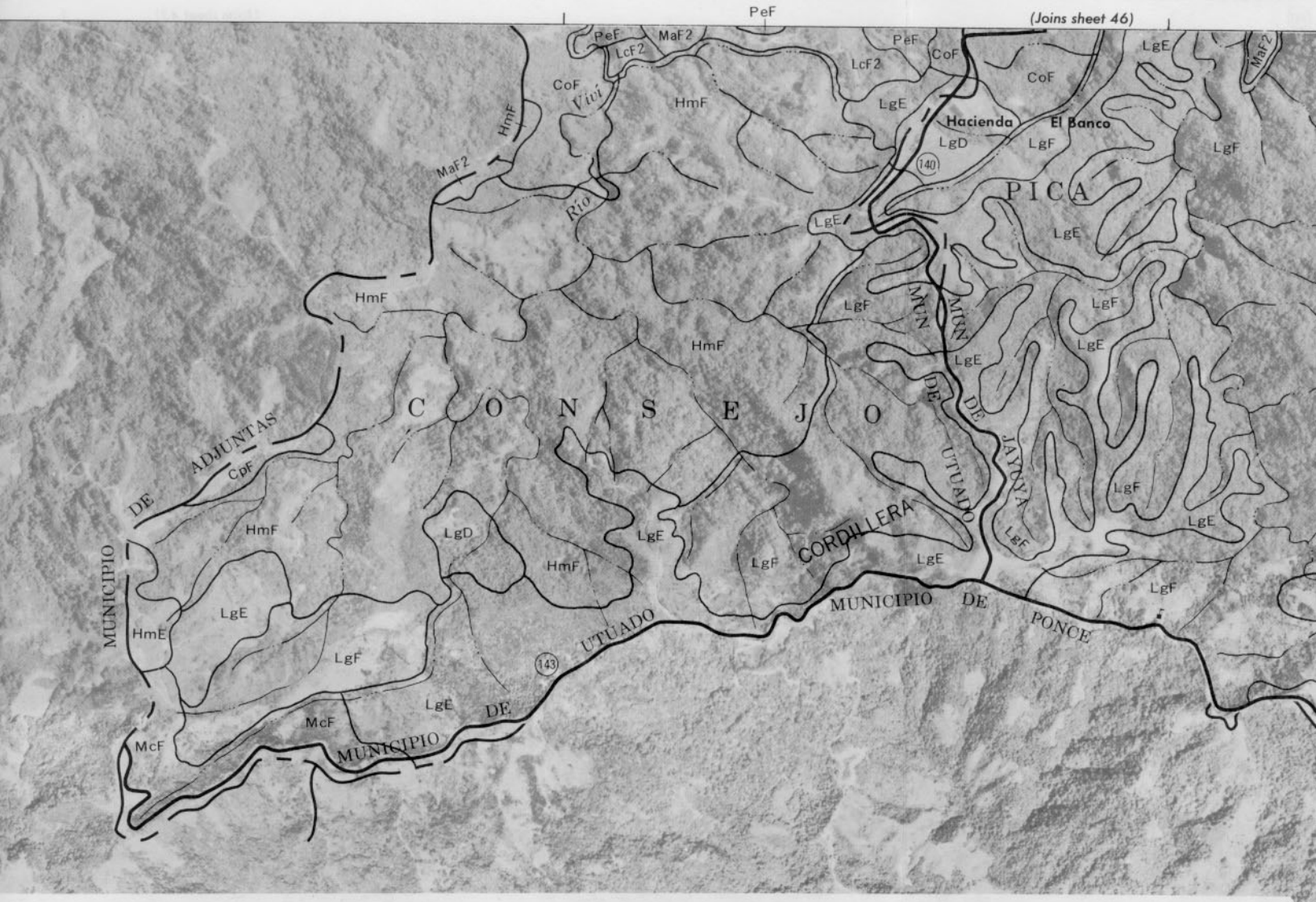
1 5000

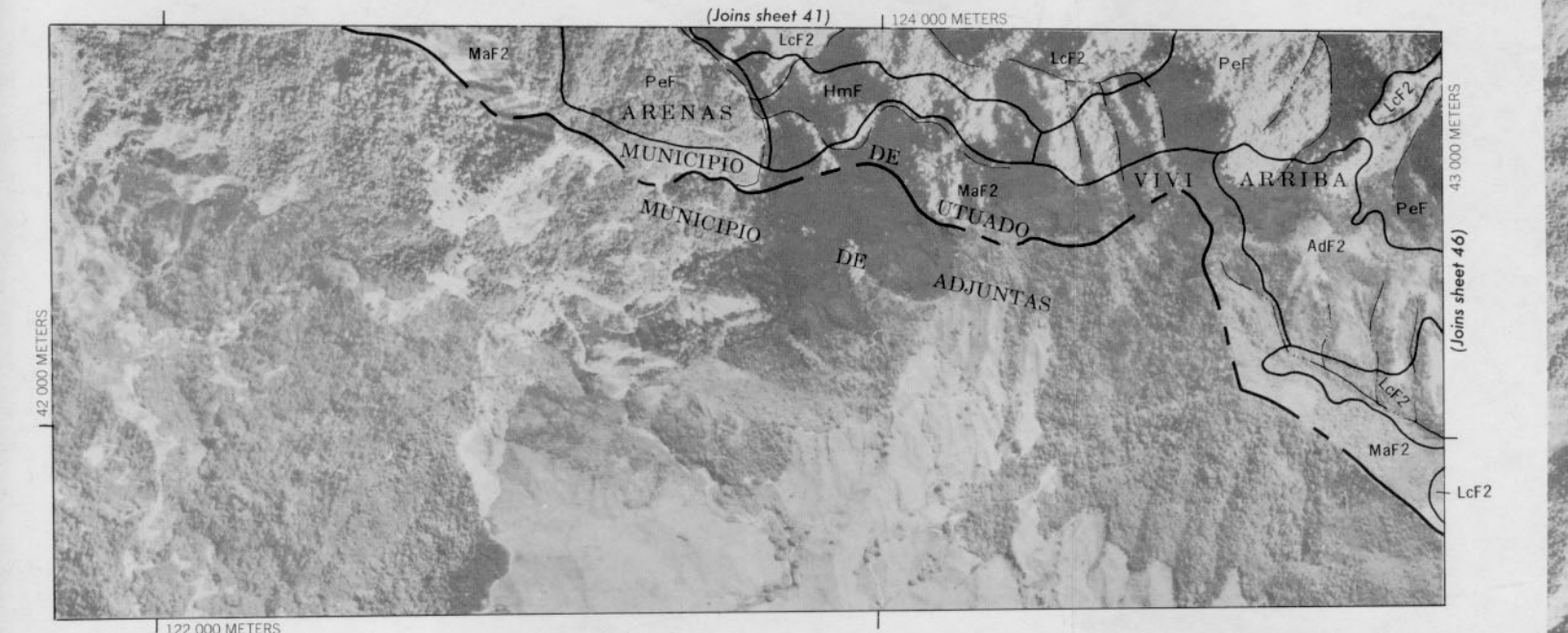

N
(Joins sheet 42)
(Joins inset, sheet 48)
1 Mile
5000 Feet
40 000 METERS
126 000 METERS
VIVÍ ARRIBA
PASO
CONSEJO
Río Viví
Cerro Prieto
Hacienda La Esperanza
Hacienda El Progreso
MUNICIPIO DE ADJUNTAS
MUNICIPIO DE UTUADO
605
PeF
LcF2
LcE2
Vm
AdF2
InE
MaF2
HmE
CpF
CoF
HmF
DaD2
CaF
Io


132 000 METERS
42 000 METERS
JAYUYA ABAJO
PALMA
COLLORES
JAUCA
Río Grande de Jayuya
Río Jauca
MUNICIPIO DE JAYUYA
MUNICIPIO DE UTUADO
Collores
Hacienda Jauca
Hacienda Santa Rosa
PeF
LcF2
LcE2
Vm
Re
Rm
InD
InE
MaF2
CaF
CoF
CpF
AdF2
LgF
LgE
140
531
144
528
527
(Joins sheet 47)
(Joins sheet 48)


134 000 METERS
42 000 METERS
(Joins sheet 46)
Santa Bárbara
JAYUYA
Jayuya
Río Grande de Jayuya
Río Caricaboa
Río Vegüitas
Río Zamas
VEGUITAS
ZAMAS
Hacienda Los Planes
Parador Gripiñas
Piedra Blanca
PeF
LcF2
Re
Rm
Vm
InD
InE
LcE2
MaF2
LME
DaD2
144
141
527
528


(Joins sheet 43)
N
Las Tres Palmas
MUN DE CIALES
MUN DE JAYUYA
C O A B E Y
Coabey
Rio
Rm
Vm
InD
LcF2
LcE2
PeF
MaF2
MuF
LME
LgE
144
539
Salientito
Saliente
Hacienda Gripiñas
Parador Gripiñas
Caricaboa
HmF
S A L I E N T E
Cerro Saliente
Piedra Blanca
(Joins inset, sheet 39)
(Joins sheet 49)
140 000 METERS
40 000 METERS
1 Mile
5000 Feet

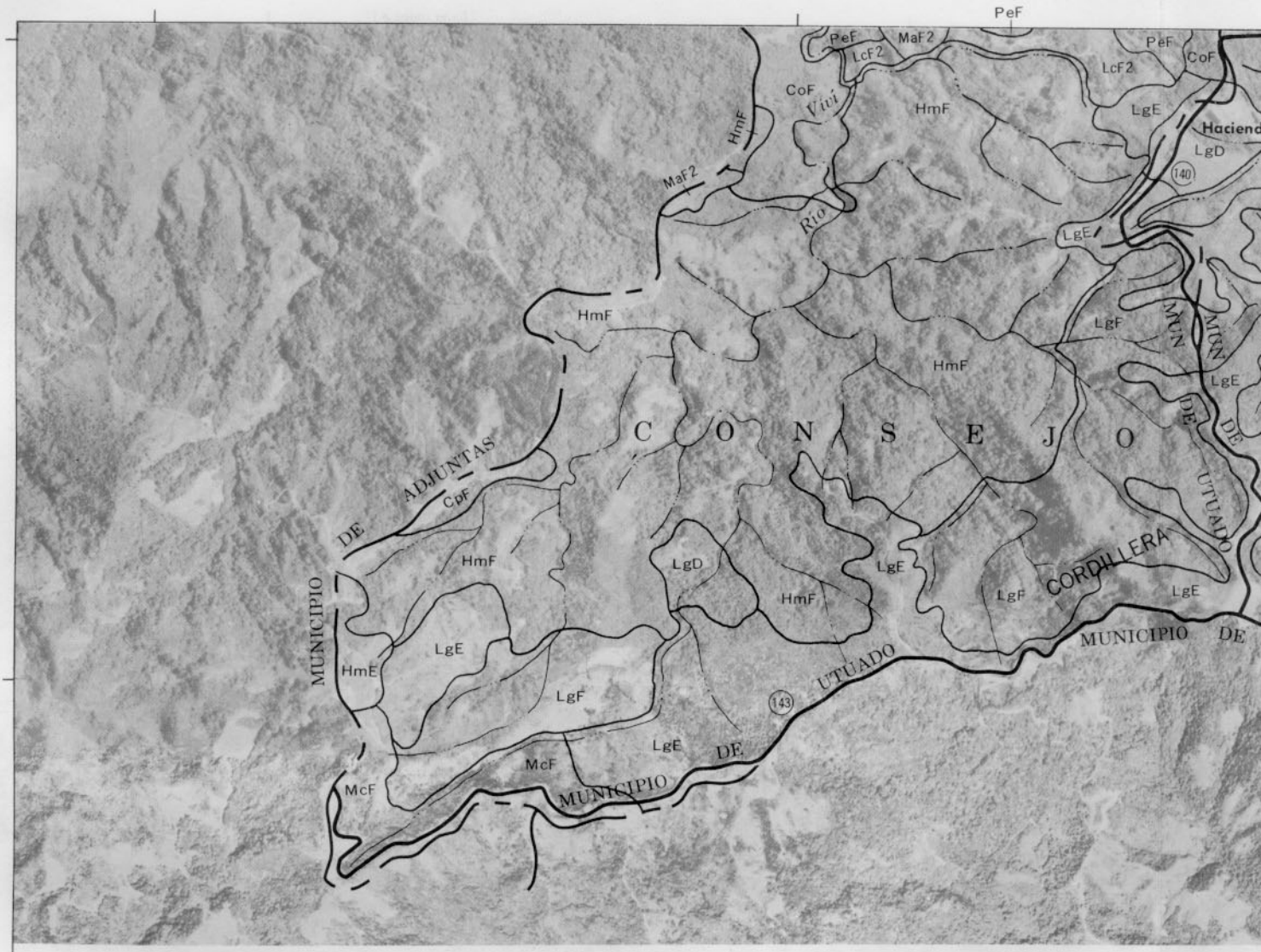


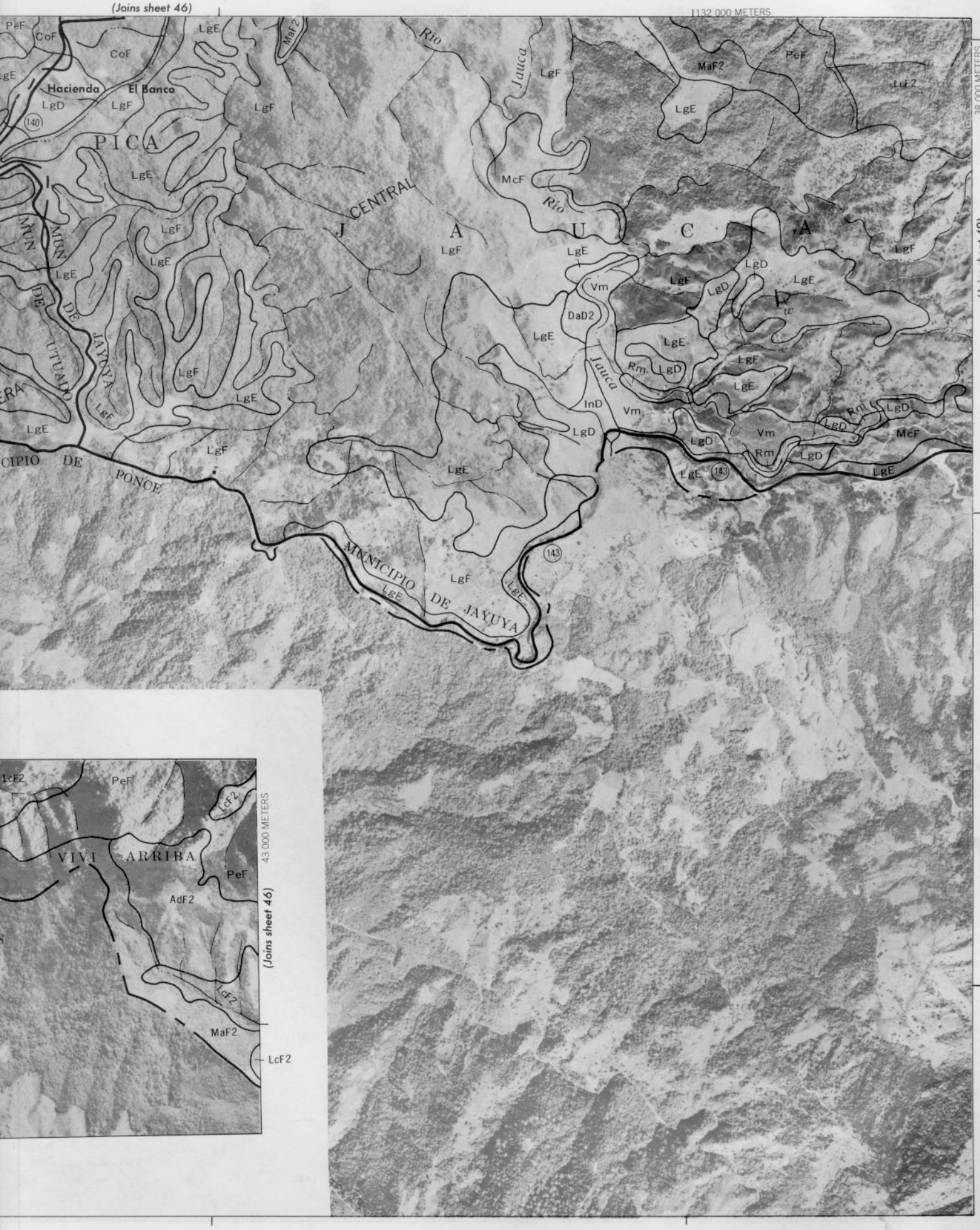


1000 AND 2000-METER GRID TICKS

ETER'S

ARECIBO AREA, PUERTO RICO




(Joins sheet 46)
1132 000 METERS
38 000 METERS
(Joins sheet 49)
PeF
CoF
LgE
MaF2
Río Jauca
LgF
MaF2
PeF
LcF2
Hacienda
El Banco
LgD
LgF
140
PICA
LgE
MCF
Río
CENTRAL
JAUCA
LgF
LgE
LgD
Vm
DaD2
Rm
InD
MUN
DE
UTUADO
JAYUYA
ERA
CIPIO DE PONCE
143
MUNICIPIO DE JAYUYA
43 000 METERS
(Joins sheet 46)
VIVI ARRIBA
AdF2


134 000 METERS
MaF2
LME
Cerro
de Punta
LME
UCA
LME
Monte
Jayuya
MUNICIPIO
LME
143
MUNICIPIO
DE
PONCE
DE
JAYUYA
S
(Joins inset, sheet 39)
42 000 METERS
38 000 METERS
(Joins upper right)
MaF2
LME
LME
McF
MaF2
LgF
McF
McF
LgF
MaF2
AoF2
LgF
LgF
LgE
MUNICIPIO DE JAYUYA
MUNICIPIO DE CIALES
TORO
NEGRO
Hacienda
Tabonuco
Río Negro
Río Toro
MUNICIPIO DE CIALES
MUNICIPIO DE OROCOVIS
McF
MaF2
Río
MUNICIPIO
LgF
Lago
El Guineo
36 000 METERS
44 000 METERS
2000-METER GRID TICKS


134 000 METERS
38 000 METERS
(Joins sheet 48)
LcF2
MaF2
LME
Cerro
de Punta
JAUCA
LME
LgF
Jauca
Río
McF
HmF
LgF
MgF
LgE
143
MUNICIPIO
LME
143
MUNICIPIO
DE
PONCE
(Joins inset, sheet 39)
42 000 METERS
38 000 METERS
(Joins upper right)
MaF2
LME
MaF2
LME
McF
LgF
McF
McF
LgF
JAYUYA
CIALES
MaF2
AoF2
LgF
TORO
NEGRO
LgF
LgE
Hacienda
Tabonuco
Toro Negro
MUNICIPIO DE
MUNICIPIO DE
MUNICIPIO DE CIALES
MUNICIPIO DE OROCOVIS
McF
MaF2
Río
MUNICIPIO DE
LgF
Lago
El Guineo
44 000
2000-METER GRID TICKS


(Joins sheet 47)
49
N
Río Saliente
MaF2
LME
Monte Jayuya
MUNICIPIO DE JAYUYA
S A L I E N T E
LgF
(Joins inset)
1 Mile
5000 Feet
143
McF
Toro Negro
Cerro Maravillas
MUNICIPIO DE JUANA DÍAZ
MUNICIPIO DE OROCOVIS
0
1000
2000
3000
4000
5000
¼
½
¾
1
34 000 METERS
36 000 METERS
44 000 METERS
140 000 METERS